Noyes (H. D.)

REPORT

ON

OPHTHALMOLOGY

FOR 1870.

BY

HENRY D. NOYES, M. D.,

NEW YORK.

[*REPRINTED FROM THE N Y. MEDICAL JOURNAL, FEBRUARY*, 1871.]

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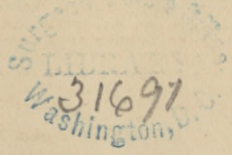

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ORBIT.

1.—*Anatomy of the Orbital Veins.* [Archiv f. Anatomie und Physiologie, s. 154, Taf. v.] Dr. SESEMAN.

THE superior and inferior ophthalmic veins do not empty the largest quantity of their blood into the sinus cavernosus, but into the facial veins. Thrombosis of the sinus, therefore, cannot seriously obstruct the orbital veins. For a similar reason, so numerous are the anastomoses of the v. centralis retinæ with the v. ophthalmica superior that thrombosis of the sinus, or its compression by tumors, cannot be a cause of retinitis, as has been asserted—superior and inferior ophthalmic veins freely anastomose with each other. When symptoms of obstruction occur, viz., œdema of the lids, fulness of the frontal veins, exophthalmus, impaired sight, they are to be explained not by simple thrombosis of the sinus cavernosus, but by the presence of thrombi at the same time in the ophthalmic or facial veins.

2.—*Ectropium; Exophthalmus; Extirpation; Plastic Operation.* By HENRY D. NOYES, M. D., New York. [Trans. Am. Ophth. Soc., 1870, pp. 129–133, with 3 woodcuts.]

A remarkable case of deformity, the consequence of necrosis of the margin of the orbit. The patient was sixteen years old, and the primary disease occurred in infancy. While removal of the eye was inevitable, the condition of the orbit would not permit the substitution of an artificial eye. Hence, besides enucleation, the conjunctiva was dissected away, the retracted state of the lids corrected, and finally flaps slidden in from the adjacent skin to completely cover in the front of the orbit. All these steps were accomplished at one operation, and the patient, notwithstanding an attack of erysipelas, did well.

Although she still was afflicted with a deformity, the operation relieved her from much distress, and restored to her the comfortable use of the other eye, which had been very troublesome. Woodcuts show the state of parts before and after the operation.

3.—*On Certain Peculiarities in the Construction of the Orbit.* By HARRISON ALLEN, M. D., Philadelphia. [American Journal of Medical Sciences, January 7, 1870, pp. 116–119.]

Among several interesting varieties described, the modifications which may occur in the lachrymal bone may be quoted. It may be reduced to a rudiment; it may be absent, a small irregular space indicating the position it should occupy; it may be absent, and there be no interspace; there may be an accessory lachrymal bone found lying between the lachrymal proper and the nasal process of the superior maxilla; a small ossicle may be seen at the anterior-inferior region of inner wall of orbit, wedged in between the nasal process of superior maxillary, lachrymal, and nasal bones.

4.—*Orbital Aneurismal Disease, and Protrusion of the Eyeball from Venous Obstruction.* By D. T. G. Morton, of Philadelphia. [Am. Jour. Med. Sciences, July, 1870, pp. 36–46.]

Case of Traumatic Aneurism of Orbit treated by Compression. By Dr. G. C. Harlan, of Philadelphia. [Am. Jour. of Med. Sci., July, 1870, pp. 46–48.]

Dr. Morton narrates four new cases of the disease, one of them treated by ligation of the common carotid, and successfully. Dr. Harlan's case was treated by compression for eight hours without cessation, and afterward for four to six hours daily for five weeks. The veratrum viride was also administered until its effect on the pulse was obtained and kept up. Patient's condition was so much improved, that he was able to resume his work as brakeman on a railroad, but after a time the disease returned. He expected to return to the hospital for ligature of the carotid.

5.—*Aneurism of the Orbit; Exophthalmus.* By Dr. Schiess-Gemuseus. [Klin. Monats. für Augenheilkunde, February, 1870, pp. 56–64.]

A woman, aged forty, was kicked in the face by a horse; a year or more afterward an orbital aneurism formed. In treatment two injections of ergotin in the lid were tried, without good effect. Intermittent digital compression kept up nine days in May, and, after a week, seven days in June. Then the common carotid was tied. Secondary hæmorrhage occurred three times. Pulsation not abolished, and after two weeks it was evident the aneurism was not cured. Five months afterward the enlarged frontal artery was sought to be tied, but was so surrounded by small arteries that only three of these could be seized. The sac was much reduced in size, and two months afterward was exceedingly small, although showing light pulsation. The whole left side of the face was abnormally vascular, and the question was raised whether this was a true aneurism or a cyrsoid, but the former opinion was adhered to. The variety of treatment, and its comparative inefficiency, are noteworthy.

MUSCLES.

6.—*The Operation for Strabismus.* By S. J. Halbertsma. Inaugural Dissertation. Utrecht, 1869. [Zehender Monatsblätter, January, 1870, p. 29.]

This paper sets forth the methods of operating done by Dr. Snellen, at Donder's Clinique, in Utrecht. For extreme degrees of deformity Liebreich's mode is adopted. He makes one remark, that, if the capsule of Tenon be incised too near the bulb, bleeding may be so free as to cause serious embarrassment, which may be avoided by keeping nearer to the inner surface of the conjunctiva. The usual mode of operating is with patient lying on the back, chloroform not given, the conjunctiva opened by a wound in the horizontal meridian, pretty long; the wound separated and the conjunctiva dissected from subjacent parts both above and below by probe-pointed scissors. The caruncle also is raised. The tendon is next seized with the forceps and securely grasped; one blade of the scissors is pushed beneath it closely as possible to the sclera, and the insertion clipped. Incisions may be made as needful above and below, and the blunt hook used to ascertain whether any fibres remain undivided. On behalf of this method it is claimed that it is easier, that it is less painful, that thrombi do not so readily occur, and the operation can be exactly regulated. Sutures may or may not be employed.

When operating for insufficiency, the tendon is exposed in the same manner, but for a greater distance backward. When cut, a little bit is left

attached to the sclera, and two sutures are put in so as to bring forward the muscle, in the following manner: The first begins at the upper and inner edge of the conjunctival wound, then through the stump of the tendon, then deep as the case may require into the muscle, which is dragged forward, and finally into the conjunctiva, and tied. The other suture takes a similar course for the lower border of the conjunctival wound, and the effect of both is to drag the muscle forward. The conjunctival wound may be united if needful by a suture from above downward. This operation has special application for insufficiency with paresis of the antagonist.

7.—*A Case of Strabismus Concomitans Convergens Intermittens.* By Dr. W. WAGNER. [Klin. Monats. f. Aug., April, 1870.]

A child, six years old, with convergence of 3½‴ which, for two months, appeared every four or five days, and lasted twenty-four hours; these recurred regularly every other day for two months. During six months more the case was observed and antiperiodics given in vain. There was no error of refraction or accommodation. A very careful and restricted setting back of one internus cured the malady—which was regarded as coming from disturbed innervation.

8.—*A Case of Monolateral Nystagmus, in which the Oscillations are vertical.* By Dr. ZEHENDER. [Klin. Monats. f. Aug., April, 1870.]

The affected eye was perfectly blind, except at the periphery of the field, and the nerve showed signs of atrophy; the other eye normal; patient a girl nine years old.

9.—*A Contribution to the Subject of Strabismus.* By Dr. C. R. AGNEW, N. Y. [Trans. Am. Oph. Soc., 1870, p. 148.]

An advancement of the inferior rectus, to correct deformity produced by a faulty operation on account of converging squint.

EYELIDS.

10.—*Clonic Spasm of the Eyelids; Section of the Supra-orbital Nerves.* By Dr. J. TALKOW, of Tiflis. [Klin. Monats. f. Aug., May, 1870, pp. 129–145.]

The spasms affected both eyes, had lasted seven years, and wrinkled the eyelids in deep furrows; the cause could not be assigned. A surgeon had excised a strip of skin from the lids, with the production of harm rather than good. Injections of morphia and atropine in the temple were fruitless. Extensive splitting of the outer canthus to the temple was of temporary benefit. On the other eye subcutaneous myotomy was of no avail.

Several similar cases are quoted, and the treatment by neurotomy commented upon as performed by Graefe and Wecker, and recommended by Romberg. The left supra-orbital nerve was cut by subcutaneous section under the influence of local anæsthesia. Immediately, spite of a thrombus, the size of a pigeon's egg, the patient could open his eye. Three weeks after, he had neuralgia in this region. Electrization was proposed, but patient refused, and left the hospital. After nearly a year the patient had acute rheumatism, which might be considered the cause of his trouble. The side where neurotomy had been done was insensible and free from spasm, but the other eye suffered as before.

11—*A Case of Xanthelasma Palpebrarum.* By Dr. ARTHUR GEISSLER. [Klin. Monats. f. Aug., February, 1870, p. 64.]

A discoloration of the skin of the lids, also called vitiligoidea, in a wom-

an aged forty-four, which was in the form of a horseshoe, and of a straw-yellow color.

12.—*Xanthelasma Palpebrarum.* By Mr. JONATHAN HUTCHINSON. [Ophthalmic Hospital Reports, vol. iv., pp. 265, 275, 282.] Three cases are given—the patients being forty-five, fifty-seven, and fifty-eight years old.

13.—*Favus on the Lids and in the Canaliculi.* By Dr. NARKIEWICZ-JODKO. [Gazeta Lekarrka, Warsaw, March 14, 1869.] Two cases are quoted in Zehender.

14.—*Three Cases of Herpes Zoster Frontalis.* By Dr. B. J. JEFFRIES, Boston. [Trans. Am. Oph. Soc., 1870, pp. 100–103.]

15.—*A Case of Xanthelasma Palpebrarum.* By Dr. J. HIRSCHBERG, of Berlin. [Klin. Monats. für Aug., May, 1870, p. 167.]

CONJUNCTIVA.

16.—*The Use of Acetic Acid in Affections of the Conjunctiva and Cornea.* By Dr. B. A. POPE, of New Orleans. [Archives of Ophthal. and Otol., vol. i., part ii., pp. 446–458.]

Dr. Pope employed acetic acid of sp. gr. 1,041 (No. 8), which he says is a mild escharotic when of this strength. With it he treated a rebellious case of warty degeneration of the palpebral conjunctiva for which ordinary caustics and excision had very slowly effected a cure, but could not preserve against relapse. The second attack was cured by the acid in less time, and finally. It was applied by a very fine camel's-hair brush once every day, and only to the spots to be destroyed. Other cases thus treated were the relaxed and hypertrophied state of the conjunctiva in the *cul-de-sac* following chronic conjunctivitis—some cases of trachoma in the stage of development, as an occasional application, and strictly confined to the granulations—an inflamed pinguecula which the patient refused to have excised—hypertrophy of the caruncle and semilunar fold in pterygium—in two cases of calcareous degeneration of the epithelial layer of the cornea sometimes combined with excision—in a case of dense opacity of the cornea, the result of partial sloughing after ophthalmia neonatorum. When put upon the cornea the acid will cause an ulcer after two or three applications, and care must be taken not to let this process make unmanageable progress—with such vigilance the new tissue which repairs the ulcer was found to have a gratifying degree of transparency. It needs to be repeated a number of times to attain the best result, and is a remedy which only a skilful hand should apply, and an experienced eye watch, but doubtless it may do good service in some intractable cases, as enumerated.

17.—*A Peculiar Case of Conjunctival and Corneal Inflammation.* By Dr. D. B. ST. JOHN ROOSA, New York. [Transactions American Ophthalm. Society, 1870, pp. 88–91.]

An inflammation in some respects like herpes corneæ, accompanied by partial ptosis, which recurred every week for nine months, seldom failing to appear at its expected time. Its severe pain lasted a few hours, and its duration was about two days. Local and general treatment of little avail—no important change of tissue—the other eye perfectly well.

18.—*Canthoplasty in the Treatment of Diphtheritic Conjunctivitis.* By Dr. C. M. ALLIN, New York. [Trans. Am. Oph. Soc., 1870, pp. 91–93.]

Pressure of the swollen lids relieved more effectually by stitching the

conjunctiva to the edges of the wound at the outer angle, than by merely slitting without introducing the stitches. The ordinary treatment by iced compresses, and nitrate of silver applied in addition.

CORNEA.

19.—*Quinine as a Local Remedy in Certain Forms of Conjunctival and Corneal Disease.* By Dr. J. S. Prout, Brooklyn. [Trans. Am. Oph. Soc., 1870, pp. 114–117.]

Two cases of trachoma with pannus are reported as having been treated by application of dry quinine, and of quinine in solution, to the lids, with beneficial results, which appear to be owing to the special effects of the remedy. Similar good results are narrated from daily application of solution of muriate of quinia ℈ij and ℥j in a case of traumatic and spreading ulceration of the cornea. At the meeting of the Ophthalmological Society in Heidelberg in 1869, Prof. Nagel brought this subject forward, and there is sufficient evidence in behalf of the efficacy of this treatment to induce its being thoroughly tried. We would suggest its special fitness in ulceration and suppuration of the cornea in addition to the usual remedies.

20.—*The Nerves of the Conjunctiva and Sclera.* By Friedich Helferich. [Würzberg, pp. 35, 1870.]

21.—*Ulcus Corneæ serpens and its Treatment.* By Dr. Saemisch. [Bonn, 1870.]

Under the above title is indicated an ulcerative keratitis whose tendency is to spread in extent and in depth, which occupies the central part of the cornea, which in about sixty per cent. of the cases is accompanied by hypopion. Frequently there is severe ciliary neuralgia, sometimes almost none; there is always coincident iritis. This disease often occurs in children, is often traumatic. The usual treatment, by atropine, warm fomentations, paracentesis and iridectomy, saves a certain number of such eyes; but Dr. Saemisch announces a much more successful plan, which he has adopted in thirty-five cases. He has cured, he says, thirty-four out of the thirty-five. If this be not too warm a statement of results, we certainly have reason to accept the proposed method. It consists in making an incision across and through the ulcer from one side to the other, and keeping the wound open by repeatedly separating its lips until cicatrization begins. The wound begins and ends in healthy cornea, and is best made by transfixion with Graefe's knife. The wound is at first reopened twice daily, afterward once daily suffices, and Weber's probe-pointed lachrymal knife is the instrument Dr. S. uses. The instillation of atropia is kept up, and the eye protected. The cut generally relieves the pain at once, and the ordinary dangers of prolapse of iris and staphyloma are completely avoided, while the risks of mischief in the operation are easily guarded against by a skilful surgeon.

22.—*The Regeneration of the Epithelium of the Cornea.* By Dr. O. T. Wadsworth, Boston. [Boston Medical and Surgical Journal, vol. vi., No. viii.]

23.—*Versuche über Hornhaut-Entzündung.* By W. F. Norris, of Philadelphia, and S. Stricker, Wien, 1869.

24.—*Ueber die Grundsubstanz und die Zellen der Hornhaut des Auges.* By Drs. Schweiger and Seidel. [Bericht der Mathemat.-Phys. Classe der Konigl.-Sacs. Gesellschaft der Wissenschaften, 1869, pp. 305–359. Monatsblät. f. Augen., June, 1870.]

25.—*Melanoma der Cornea.* By Dr. Langhaus. [Virch. Archiv, Bd. 49, p. 117.]

26.—*Ueber ein Cancroid der Cornea und Sclera, ein Beitrag zur Entwickelungs-geschichte der Carcinoma.* By Dr. A. Classen. [Virch. Archiv, Bd. 50, Heft. i.]

IRIS AND CHOROID.

27.—*Granulation Tumors of the Iris.* By Dr. J. Hirschberg, of Berlin, and Dr. Steinheim, of Bielefeld. [Archives of Ophthal. and Otol., vol. i., part ii., pp. 647–658.]

The case on which this paper is built is that of a peasant, aged twenty-one, who was wounded in the left eye by a splinter of wood. Some months after a growth appeared on the lower half of the iris; it was yellowish or flesh-colored, and slightly nodular, and filled the lower half of the anterior chamber; pupil adherent, fundus visible, sight good, field not abridged. A year later the tumor had invaded the corresponding part of the cornea, attained the size of a small hazel-nut, and overlapped the sclera. A little of the iris visible above, pupil covered by exudation. At the section, the lens was missing, and the tumor sprang from the ciliary body and iris. The microscope revealed "a vascular fibrous, parvi-cellular mass. The stroma of parallel fibres is richly developed. The cells are roundish and irregular (shrivelled by alcohol), occasionally short spindle-shaped, with distinct nuclei, a little larger than red blood-corpuscles; here and there some with many nuclei (myeloplaxes), but no giant-cells."

The tumor pronounced a granuloma, and without danger of recurrence. "The relatively youthful age of the patient, the yellow or reddish, decidedly not melanotic color, the uneven surface, and the microscopic vascularity, the very slow increase of the growth which projects quite gradually from the iris tissue, might argue for the existence of granuloma, while, in an indubitable case of sarcoma of the iris, the neoplasm presented a smooth, uniformly bluish-black surface."

28.—*Choroiditis after Relapsing Fever.* By Dr. J. Estlander. [Archiv f. Opthalmol., B. xv., ii., pp. 108–143. 1869.]

Two epidemics of relapsing fever occurred in Finland, between 1865 and 1869, and among other complications it was not rare to have disease of the interior parts of the eye. Dr. E. had seen twenty-eight cases. They appeared mostly between the second and fourth week after convalescence, sometimes two to five months afterward, seldom during the acute progress of the malady. Vision becomes clouded, but outwardly there is nothing abnormal, while by the ophthalmoscope the vitreous is seen to be turbid. The opacity, which is at first diffused, condenses slowly into small gray specks, like mucous floating in water, and with black irregular masses. At first they float about constantly, but at a later period they settle by gravitation, and only float up when the eye is moved. This condition lasts about four weeks, and perfect recovery may ensue. But more often iritis takes place after some days or weeks, announcing itself by pain, hyperæmia, contracted pupil, posterior synechiæ, exudation, hypopyum and chemosis. There is not much photophobia; tension is more likely to be abated than increased. If the exudation do not exceed posterior synechia, entire recovery is possible; but after hypopyum the pupil is apt to remain occluded, and even suppuration of the cornea, followed by atrophy of the globe, may ensue.

One case of the last sort was microscopically examined, and the lesions found to originate in the ciliary body, which was converted into a brawny

mass, and pervaded by pus-cells. The vitreous opacities were composed of cells with processes, of pus cells, of fine fibres and detritus. In the lenticular fossa the hyaline membrane was covered with exudation. Only the anterior part of the retina contained pus. The choroid was free from morbid changes, but the iris was in a condition similar to the ciliary body.

Decided antiphlogistic treatment was soon found to be improper, and atropine alone was most effectual in controlling the iritis; the adhesions would give way suddenly, the aqueous humor clear up, and the hypopyum be absorbed. Vitreous haziness was treated by invigorating diet and tonics. Sight would return in about six weeks.

29.—*Contributions to the Pathology and Therapeutics of Glaucoma.* By Prof. A. von Graefe, Berlin. [Archiv f. Ophthal., Bd. xv., abth. 3, s. 108–252.

Introducing first the subject of acute inflammatory glaucoma, Prof. Graefe considers the point, whether the loss of sight is due to disease of the retina, and states that it is sufficiently accounted for by the opacity of the media, except in the most severe cases; in which the retina must itself be damaged. The ecchymoses which so often follow iridectomy lead us to suppose an unusual brittleness (softening) of the retinal tissue, and this accords with that theory of the loss of sight which refers it greatly to paralysis by ischæmia, because of the hindered arterial supply. The prognosis of acute glaucoma after iridectomy is good, and that when the rules of the operation are not strictly observed. Iridectomy on one eye, for the acute inflammatory disease, is quite likely to be followed by an outbreak in the other eye. Especially if the other have already begun to show symptoms, this is likely to happen in twenty-five to thirty per cent. of the cases. If the second have had no prodromata, the liability is about ten per cent., and the attack takes place usually from the second to the fourteenth day.

The subject of secondary glaucoma is treated *in extenso;* the disease takes its rise from some precedent ocular affection, such as various forms of keratitis, of iritis, displacements of the lens, choroidal disease, posterior staphyloma, intraocular tumors, etc.

Then glaucoma simplex is discussed, and he concludes with some observations on the method of the operation, and on the hereditariness of glaucoma. Out of this long discussion we may select a few points.

Pannus of the cornea is not infrequently complicated by glaucoma. So long as this depends on serous iritis, as is indicated by the irritability of the eye to caustic applications, paracentesis may suffice—when glaucoma is fully declared, iridectomy alone is effectual. In the latter case the operation may sometimes aggravate the pannus, but soon this subsides. If, however, paracentesis were more frequently resorted to in the cases of bad pannus with deep anterior chamber, iridectomy would seldom be needful. Corneal cicatrices, when attended by adhesions of the iris, often demand iridectomy—as well for optical as therapeutic reasons. So urgent is this necessity that when a prominent leucoma adherens (partial staphyloma), follows ophthalmia neonatorum, Graefe would at once operate; and, if the diameter of the cornea begin to enlarge, and the anterior chamber to grow deep, the operation cannot be deferred.

The condition known as cornea globosa or hydrophthalmus congenitus, which begins *in utero*, is not suitable for the operation. A form of chronic keratitis in which an opacity runs across the cornea at the palpebral fissure, is attended by very moderate irritation, is composed of minute yellowish or brownish points, and progresses for months or years, is apt to end in iritic complication and glaucoma. For better understanding of this disease in its various stages, four pictures, three of them in color, are given. One, Fig. 4, shows a case of twelve years' duration, and the whole

globe in glaucomatous degeneration. Iridectomy should be done at an early period of this trouble, certainly immediately upon the occurrence of obscurations or limitation of the field. This affection has met the eye of every ophthalmic surgeon, but has never been so carefully described, and its natural history so fully followed out. Now that its tendencies to evil have been so well pointed out, the remedy which can arrest some of the mischief will not fail to be applied.

As to complications of the iris, not much need be quoted. Great stress is laid upon the importance of iridectomy when there is complete posterior synechia, and that in spite of the fact that at the time vision may not be much injured, and besides that by the operation a small fraction of visual acuteness may be sacrificed. The ulterior dangers of this condition are too serious to admit of parley. A curious fact is noted, that congenital coloboma iridis is no protection against secondary glaucoma, in case there should be displacement of the lens, or chronic choroiditis as sometimes happens; and such cases do not refuse to yield to the beneficial effect of iridectomy.

The irritation excited by dislocation or reclination of the lens into the vitreous is a difficult condition to treat. Sometimes when the lens touches the iris, iridectomy gives relief, but at other times nothing but extraction of the lens can do good, while this is extremely perilous because of loss of vitreous, cyclitis, etc. Wounds of the capsule in old people are followed by much more irritation of the eye than in children. In the latter, Graefe thinks it not needful to be so ready to do the operation as has of late years been the general disposition, because young eyes bear intraocular pressure remarkably well. He regards pushing forward of the iris a better index for iridectomy than mere augmented tension. This remark upon the intolerance of pressure in eyes of old persons bears unfavorably upon the attempt to hasten the maturity of imperfect cataract by discission.

Why serous choroiditis should sometimes lead to softening, and even phthisis bulbi, and in other cases to glaucoma, can only be conjectured. Age certainly exhibits the latter tendency, but we cannot account for the differences which we witness. If subretinal effusion have occurred, we very seldom see glaucoma. The chronic forms of choroiditis with pigment alterations very seldom result in glaucomatous tension. They are frequently complicated by vitreous opacities, especially in the equatorial variety of choroiditis, and the important remark is made, that paracentesis of the anterior chamber often has a decided effect in causing their disappearance.

Staphyloma posticum is frequently complicated by secondary glaucoma. The media remain clear, but tension increases, the nerve becomes excavated, the visual field contracted. There may be evidences of inflammatory action, in opacities of the vitreous, and of the aqueous humor, but most usually the symptoms are those of glaucoma simplex. The form of optic-nerve excavation deserves notice. It most usually does not exhibit the abruptness which belongs to pressure excavations, but, because of the precedent distention of the sclera, has on one side a sloping margin, and may not reach quite to the edge of the papilla. But, when, by light palpation, arterial pulsation is produced, and the vessels show irregular distention, and the visual field begins to be impaired, we must regard these excavations as glaucomatous. It is, moreover, peculiar to these cases that central vision long remains relatively intact, when peripheral vision has seriously failed. The limitation of the field often assumes the usual form beginning in the nasal side, but sometimes advances so as to surround the middle of the field by a zone of blindness, leaving beyond to the temporal side a region capable of sight. The peculiarities of this limitation are made clear by diagrams. The excavation above described may subsist for a long time

without disturbance of function. But, if this do occur, iridectomy is imperative. If sight has been so much damaged that defect of field comes close to the centre, iridectomy does sometimes impair the central vision. The effect of iridectomy on the progress of staphyloma cannot be stated—that in young myopes it improves the range of accommodation is positive.

The only form of retinal disease liable to be complicated by glaucoma is retinitis hæmorrhagica; this belongs to people beyond middle life, is attended by sclerosis of the vessels, and not seldom is succeeded by cerebral hæmorrhage. This form of secondary glaucoma Graefe has seen twenty-two times. In five cases the other eye suffered an attack of retinitis apoplectica after a few months; in six cases the second eye went through the same succession of symptoms as the first, viz., hæmorrhages, glaucoma, total loss. Unhappily, treatment by iridectomy or any other means does not help these cases. When, on account of persistent pain, an operation is to be considered, and the other eye to be protected, extirpation rather than iridectomy will claim preference.

That the essential feature of glaucoma consists in increase of ocular tension, Graefe finds fully confirmed in the case of glaucoma simplex, which name he accepts, and to which he devotes twenty pages. The difficulty lies in detecting the cause which provokes the hypersecretion. That it lies within and not outside of the eye, he thinks most probable; also, that rigidity of the sclera has much to do with it, whether this be a primary or secondary condition; that the effect is to be looked for in irritation of the secretory nerves, rather than in obstruction to the venous circulation; in this last point Graefe does not accord with the views of Stelwag. In these cases the results of iridectomy are peculiar. More than one-half of the cases are permanently benefited. In one-fourth the ocular tension is not completely reduced to the normal standard, and, though vision is longer retained than without operation, after a time the globe becomes harder, and a second operation is demanded.

In another quota, the benefits of the operation are of still shorter duration, and a second interference avails nothing, or only little. In five cases, two per cent. of all, iridectomy was followed by destructive inflammation and total loss of the eye. The behavior of the eye immediately after the operation gives indications for ulterior prognosis. If it continue hard, the anterior chamber not reëstablished within two days, permanent good is not to be expected; if tension is not abnormal, nor pericorneal irritation and neurosis increased, while the anterior chamber becomes filled in three or four days, the result may be good. But even though inflammatory reaction does not arise, if the globe continue hard, the neurosis remain, the iris and lens pressed against the cornea, and sight extinct, the case gives no hope. If there be any undue tension, the pressure-bandage must be omitted, and the plaster-strips applied; then atropine not to be used—the slightest pain controlled by morphia injections, calomel given as a purgative, and warm fomentations applied.

In some cases for which an iridectomy does little good, a second one on the opposite side of the iris has been found to be far more effectual than when done alongside of, and increasing the first excision, and, by careful comparisons, Prof. Graefe became convinced that this may be accepted as a general rule.

30.—*Contributions to the Anatomy of the Ciliary Muscle.* By Dr. A. Iwanoff. [Archiv für Ophthal., Bd. xv., Abth. ii., s. 284–298.]

In addition to his former researches into the anatomy of the ciliary muscle, contained in a previous number of the Archives, Dr. Iwanoff has undertaken to discover what differences it may have in myopic and hypermetropic eyes. That the difference of refraction involves a great difference

in the accommodative function has long been maintained, and a corresponding variety in the ciliary muscle is to be expected. It has been maintained that in hypermetropia the muscle would be found large and greater in bulk, while in myopia it would be thin and smaller. The examination revealed quite another state of facts. In twelve myopic eyes, whose axes were from 28 to 34 mm. in length, in all myopia being over one-quarter, there was no atrophy of the muscle, but it was thicker and longer than in emmetropia.

The muscle is composed of two sets of fibres—one external and running in the meridians of the globe, pointed out by Bowman and Brücke; the other set internal, at the anterior part circular in direction, and described by Arlt and H. Müller.

In myopic eyes the circular fibres were almost entirely wanting, and the meridional fibres unusually numerous.

In four hypermetropic eyes, whose axes were from 19 to 20 mm., the ciliary muscle was found thin and pushed forward, while in myopia it was thick and shoved backward. In hypermetropia, the posterior portion of the muscle was atrophied, the anterior part hypertrophied; that is, the circular fibres were in excess. The difference, then, in the structure of the muscle in myopia and hypermetropia is that in myopia the meridional fibres are most numerous, in hypermetropia, the circular most numerous.

The large development of circular fibres in hypermetropia affords a better starting-point for the action of the longitudinal fibres, and enables them to make the great effort to which the refractive condition compels them. Their line of traction is thus made more oblique from before, backward and outward—that is, coincides less with the surface of the globe, and more efficiently relaxes the zonula of Zinn.

The ciliary muscle of myopes must exert a greater traction on the choroid than of hypermetropes; and in this is the reason why the former have so much more frequently the atropic choroidal crescent at the optic nerve, because the pulling of the ciliary muscle on the choroid terminates at the latter's fixed point—the nerve. A similar effect occurs occasionally in hypermetropes, but far less frequently. Undoubtedly other factors have a part in the perineurotic choroidal atrophy of myopes, but the character of the ciliary muscle and its action are to be taken into account.

The above anatomical differences are important items in explaining with exactness the physiology of accommodation.

31.—*Cyst of the Iris.* By Dr. H. Knapp, of New York.

A Case of Cyst of the Iris. By Francis Simrock, M. D., of New York.

Cyst of the Iris cured by Operation, Zinn's Membrane forming its Anterior Wall. By Charles M. Allin, M. D., of New York. [Trans. of the Am. Ophth. Soc., 1870.]

Of the above, two cases are new. Dr. Knapp reported the good condition of the eye on which he operated a year ago, and which he narrated to the Society.

32.—*Results of Thirteen Passavant's Operations for breaking up Attachments of the Iris to the Capsule of the Lens.* By Dr. B. J. Jeffries, Boston. [Trans. of the Am. Ophth. Soc., 1870.]

There were four eyes operated on—one eye eight times within a month, another eye three times within a week; two other eyes each once. In all cases ether was given, and the results were satisfactory. Sketches are given of the outline of the pupils at various stages of the proceeding.

33.—*The Musculus Dilatator Pupillæ, in Mammalia, Men, and Birds.* By Johann Dogiel. [Archiv für Mikroskop. Anat., Bd. vi., Heft i., pp. 89–99.]

The existence of the muscle is demonstrated by long treatment of the iris in weak acetic acid, and subsequent coloring by an acidulated mixture of carmine and glycerine.

34.—*The Effect of Atropia on Intra-ocular Pressure.* By Dr. Adamiuk, of Kazan. [Annales d'Oculistique, lxiii., p. 108, March and April, 1870.]

Intra-ocular tension is the result of the lateral pressure on the walls of the vessels, the fluid contents of the globe being regarded as products from the vessels.

Atropia, by experiment, has been shown to diminish the exosmosis of fluids from the vessels. If a fine trochar is inserted into the anterior chamber, about five drops of aqueous humor escape; but, if the eye is under the influence of atropia, only about three drops escape. The pressure in a cat's eye stood at 23 of the manometer, and rose to 33, after irritating the conjunctiva by spirits of ammonia. In the other eye to which atropia was applied, the manometer indicated only 28 under the same irritation. In the first eye, after cessation of the irritation, the manometer fell to 28; in the second eye, it fell to 21, proving that atropia had hindered the exosmosis.

The effect of atropia on the vessels is not to paralyze them, but, on the contrary, it stimulates them to contraction. If the sympathetic be cut, the quantity of filtrate from the vessels is doubled. Finally, it is shown that the filtrate from the vessels, when affected by atropine, is less plastic than at other times. This has a direct influence on the exudation of inflammation.

LENS AND VITREOUS.

35.—*Communication to the Editor upon the Peripheral Linear Section for Cataract.* By Prof. A. von Graefe. [Monatsblät. für Augenheilkunde, January, 1870.]

In this article Prof. Graefe comments on the objections which Steffan made to his mode of operating. Among other things, he asserts the wound which he makes to be 5‴ in length, which is about 11 mm., or $\frac{7}{12}$ of an English inch. He says that he was at this time, the latter part of 1869, in the eleven hundredth of his operations by peripheral linear section. Of his last four hundred he had yet made no report, and of them there was little to be said. But, as to opening the capsule, he had adopted a plan which A. Weber employed—to make two vertical cuts in the side of the pupil, then a transverse cut below, and another transverse one above, within a millimetre of the upper border of the lens. Thus a square piece is included, and may sometimes be brought out, but always leaves a clearer pupil.

Considerable space is given to the after-treatment. The padding over the eye to be soft, uniform in pressure, and the whole dressing comfortable to the patient. He expresses himself decidedly against leaving the dressing unchanged for several days, having, he says, experimented carefully enough to be satisfied on this point.

Having operated in the afternoon, the bandage is removed in the evening, and again next morning, and afterward daily, or, without harm, twice daily. On the first evening, sufficient opening of the lids to let out clots or lens-matter, and to see with a candle the lower part of the cornea, is useful, and not dangerous.

He lays the greatest stress on the importance of preventing pain. He

operates usually without anæsthetic; if the pain of the wound do not subside soon, but rather tends to increase, he gives a hypodermic injection of sulph. morphiæ in the temple. If this do not give relief, the bandage is taken off, and a soft, moist sponge applied for a few minutes to the eye. This relates to the period up to three hours after the operation. After six hours have passed there should be no specially unpleasant feeling about the eye: if there be, it must not be lightly regarded, but met either by a second morphia-injection, or, if the pulse is excited, by taking four to five ounces of blood.

To insure good sleep, if it be uncertain, give 40 grains of chloral—this to depend on the effects of morphia already, perhaps, administered, and may require to be repeated.

The time of reaction of the wound is from the twelfth to the twenty-fourth hour. If there be any pain toward morning of the first night, the bandage should be taken off; if there be no chemosis, or swelling of lids, the wound need not be inspected, and the freshening of the eye and additional morphia will suffice. But, if the secretion of tears be copious, the upper lid puffy, energetic means must be adopted. The wound to be inspected to know if suppuration threatens. The skin of the lid to be touched with lapis mitigatus; the bandage to be more snugly applied, and from robust patients a venesection of six ounces, to be followed in half an hour by a morphia-injection in the temple. A free calomel-purge is given soon after the venesection. With weakly persons, the bleeding is omitted, and the dose of calomel made moderate. Usually in six hours afterward a decided improvement is found in the symptoms. The utility of the bleeding is limited to a very early, and that the initial, period; when suppuration has begun it is useless. For this, the caustic to the outer surface of the lid is his chief reliance, and the bandage changed every six hours. To feeble patients he gives quinine. If there be gastric irritation on the second day, he does not hesitate to give an emetic, and continues the cauterizations and bandage. For suppurations he uses warm fomentations only for a short time when the bandage is changed, not now resorting to them so much as formerly. Iritis he treats in the usual way.

36.—*Graefe's Peripheral Linear Section.* By Dr. Steffan. [Monatsblät. für Aug., February and March, 1870.

The author, who took exception some time ago to certain assertions about this section, now concedes that, as Graefe says, it is possible to bring out the largest lens through a peripheral linear section, whose internal length shall be 4.5‴, and the height of the flap 0.5‴; but he asserts that this section is much more difficult than to make a flap on the periphery with a height of 1½‴ to 2‴. He finds the latter yields him better results than the former, and thinks the directions Graefe gives must be adhered to in the minutest particulars in order to secure a success approaching what he gives.

37.—*Remarks on some Practical Points concerning Cataract-Extraction.* By Dr. H. Knapp. [Trans. Am. Oph. Soc., 1870, pp. 143–147.]

38.—*Beiträge zur Normalen und Pathologischen des Auges. Contributions to the Normal and Pathological Anatomy of the Eye.* By Dr. Iwanoff, with 5 plates. [Archiv für Ophthalmologie, Bd. xv., Abth. 2, s. 1–105.]

The principal part of the paper is a discussion of the occurrence of detachment of the vitreous.

A distinction is first made between dissolution of the vitreous body and its detachment from the retina. The former has long had a place in text-books, under the name of synchysis—the latter has not been obseevrd

until within a few years. The pathology of synchysis consists in fatty degeneration of the cells and stroma of the structure. It begins at the deepest parts of the substance, spreads gradually to the remaining parts, and occurs most frequently in old people. This change belongs to the series of senile involutions, like arcus senilis, the condensation of the lens, etc. Dissolution and detachment of the vitreous are much more emphatically morbid in their character, and often the precursor of detachment of the retina.

The cases in which this change is described are those of penetration of the eye by foreign bodies, of extraction of cataract, of contusion, of extreme myopia, and of glioma. The morbid appearances are given in detail, and the conclusions are as follows: That the hyaline membrane is nothing more than the membrana limitans interna retinæ—and not an independent structure—a view which Henle has already declared. Sometimes this attaches itself to the vitreous and sometimes to the retina, and has thus received distinct names, according to its relationship.

How detachment of the vitreous occurs in myopia, in staphyloma of the cornea, or after extraction of cataract with loss of vitreous, is not difficult to understand. The vitreous either does not completely fill up the eye, or there is a sudden relief of tension of the globe—it is not surprising that a serous transudation should occur, as it were, *ex vacuo*. The vitreous may for a long time remain but little changed in contact with this fluid, or it may undergo extensive transformation into connective tissue, with shrinking of its bulk.

A most interesting process is detachment of the vitreous after penetrating wounds by foreign bodies. It usually becomes funnel-like in form the apex at the optic nerve, the base at the equator. This condition is very slow in being developed, and depends on what many observers have described, viz., the change of the vitreous into connective tissue. Around the foreign body cells first appear of rounded forms; they become stellate, fusiform, etc., and extend into other portions of the vitreous; fibres soon appear, and, by absorption of the more fluid parts, the whole becomes converted into connective tissue, with condensation and shrinkage. Now the retina becomes detached by effusion behind it, or the effusion may simply fill up the space between the vitreous and the retina. A similar explanation may be given in cases of irido-choroiditis, without the presence of a foreign body. To this category also belong many of the cases of blindness following the operation of reclination of the lens.

And, in extracting cataract, the mischief which may possibly follow the loss of vitreous is not confined exclusively to the period of healing, but may appear at a later time, after months or years, in consequence of similar changes in the vitreous.

In enucleated eyes detachment of the vitreous is now more frequently seen than formerly, because this is to be looked upon as a stage preliminary to detachment of the retina, and the enucleation is done at a much earlier period in the symptoms than before.

39.—*History of the Corpus Vitreum and its Forms of Inflammation.* By Prof. v. Hasner, Prague. [Vierteljahrschrift für die praktische Heilkunde, Band ii., 1870, s. 1–12.]

A brief review is given of the views, ancient and modern, of the anatomy of the vitreous, and the nature of its morbid processes. Stilling, by means of carmine staining, was able to show that there is a central body or nucleus situated rather forward, and a peripheral substance having a laminated character; also that there is a central canal from which fissures proceed in a threefold direction. The nucleus is intersected by a net-work of anastomosing cells. These cells, with long, delicate processes,

have been described by Iwanoff and others, while Finkbeiner, Hannover, and Coccius, found large flat epithelium. The latter forms would seem to exist in the outer layers, while the irregular and anastomosing cells occupy the interior. The gelatinous transparent substance surrounds and contains them. From the undoubted fact of the presence of cell-forms, a theory of inflammation of the vitreous may be built up, and Prof. Hasner subdivides it into serous or hydrops vitrei, plastic or hypertrophic, and purulent.

The condition formerly called synchysis he would designate as hydrops of the nucleus. Let this condition be exaggerated so as to cause increased tension and its results, and then the author finds the etiology and symptomatology of glaucoma fully accounted for. Holding, as he says, this view, which is returning to the pathological notions of centuries past, the author does not attempt to explain the various phases of glaucoma, nor meet the many objections which would at once be raised. Hydrops of the outer layers was anatomically discovered by H. Müller in 1856, and has been more recently investigated by Iwanoff, under the name of detachment of the vitreous. He shows how this may be the origin of subretinal effusions, as well as of shrinking of the vitreous body. The presence of opacities in the vitreous is explained by the products of cell-metamorphosis, and crystals of cholesterine may be expected to occur in any collection of serum which contains protein substance or fat—this readily explains the old synchisis scintillans.

Inflammatory action will further produce connective tissue under its various forms of membranes, fibres, etc., while blood-vessels and pigment may also appear. In this way we are able to account for a large part of the flocculent and other floating bodies seen in the vitreous, without invoking the intervention of the choroid and ciliary body. From these sources we have hæmorrhages and products of inflammation effused into the vitreous, but can always find other evidence of their action besides the effusions.

40.—*On the Pathology of the Vitreous.* By Dr. Hermann Pagenstecher, of Wiesbaden. [Archives for Ophthal. and Otol., vol. i., No. 2, pp. 500–552.]

A series of thirty-two experiments upon rabbits' eyes forms the basis of this attempt to settle the question whether the vitreous is capable of primary idiopathic inflammation. The evidence of inflammation is assumed to be the presence of pus, or lymphoid cells, or the development of connective tissue.

To excite inflammatory action in the vitreous, irritating substances like croton-oil, or bits of wire, etc., were introduced into it, and the resulting changes minutely observed during life by the ophthalmoscope, and the eyes submitted to microscopic inspection after death.

In his statement of the normal anatomy of the vitreous, the author agrees in the main with Iwanoff, but prefers to regard the several kinds of cells which may be discovered in it as varieties of only one primary form. It is characteristic of these cells that, while in their simplest form they are simply round, and have one or two nuclei, they undergo remarkable alterations, by shooting out irregular processes and projections; they become stellate, fusiform, filamentous; and frequently, by long threads, form connections with neighboring cells. They are contractile, slightly granular, and as closely resemble, in their primitve state, lymph-cells as the latter resemble white blood-globules. By their property of contraction and outgrowth, as well as by subdivision, they become transformed into the irregular types which may always be seen under the microscope. Even the physaliphorous cells of Iwanoff, in which one vesicle is contained within another, have been seen to proceed by successive modifications from the simple round cell. Hence, admitting the correctness of the description of the

many kinds of cells in the vitreous, the author prefers to trace them back to one form, of which all the irregular forms are but modifications.

Dr. Pagenstecher does not find epithelium on the surface of the vitreous any more than does Iwanoff.

The effect of the experiments was, of course, to cause opacities in the vitreous, and inflammatory changes also in other structures. As is already well known, the opacities exhibit lymphoid cells, and contractile round cells, with various modifications and connective tissue. But the lymphoid cells Dr. Pagenstecher believes are not generated in the vitreous, but make their way into it, as Cohnheim announced, from the enveloping membranes. He thinks this is so, because the connection of the cloudiness of the membrane around could always be anatomically proven. The details arguing in favor of this opinion are given in full. Not only did he always trace a connection of the lymphoid elements with the surrounding tissues, but the filamentous and membranous opacities he asserts also proceeded from the place of puncture. In one rabbit two fine glass tubes remained floating eight days in perfectly clear vitreous, until at last one came in contact with the wall of the eye, and opacity began.

The conclusion drawn from his experiments is in the following statement:

"That, in the vitreous, neither the gelatinous substance nor the elements contained in it, of whatever kind, are capable of inflammation from irritating causes sufficient to produce it elsewhere, nor of forming lymphoid corpuscles by morphological changes."

That is to say, the vitreous reacts sluggishly to irritating causes, and, when pus appears, it comes from an external source. A second and third formula are merely repetitions of the substance of the above, while the fourth conclusion is an assertion that "the vitreous cannot be said to be susceptible of inflammation in the same sense in which we use that phrase of other organs; but that every so-called inflammation of it is to be considered as a secondary state, depending on the changes in surrounding tissues."

This fourth conclusion in its first clause hardly needs to be stated, because the fact is self-evident; but the latter clause is not likely to be admitted merely on the proof which the author's reasoning and experiments afford. So long as lymphoid or pus cells only are to be the visible evidences of inflammation, his cases have weight, and coincide with clinical experience, for we know nothing of spontaneous suppuration of the vitreous. But he attempts to show that connective tissue cannot originate in a primary hyalitis, but that this must always be excited by an irritation of the neighboring tissues. Now, he describes how connective tissue results from metamorphosis of the normal histological elements or cells of the vitreous; and he admits that cell-growth and connective-tissue growth are facts of inflammation. That these cannot appear in the vitreous except through irritation of the surrounding membranes may yet be shown, but we cannot convince ourselves that these experiments prove it, notwithstanding the author's arguments, because every one of his experiments involved a wound of the surrounding membranes or tissues.

The present stand-point of pathology decidedly favors the view that every tissue possessing cells has inherent in it not only the power of self-maintenance through the office of these cells, but by their perverted and exaggerated activity can call forth true inflammatory action: hence, we wait to be convinced that a primary hyalitis is impossible.

The paper concludes by a description of the various kinds of opacity found in the vitreous: 1. Inflammatory; 2. Blood; 3. Such as may be called coagulations. The first disappear in part through fatty degeneration. The second are absorbed by enclosure of the blood-corpuscles in the contractile

cells which are furnished from the surrounding membranes. "The latter (viz., the contractile cells) change the coloring matter of the same (meaning the blood) to pigment, and may by further metamorphosis transform themselves into the cells of connective tissue in the vitreous. This hints at a very interesting process of absorption.

The third kind of opacities, the coagulations, result from contact with air or chemical reagents. The author suggests that the cloudiness seen sometimes about foreign bodies *in vitreo* may not be inflammatory, but the effect of coagulation. The opacity which soon occurs in prolapsed vitreous is thus easily explained.

41.—*Cases of Foreign Bodies in the Vitreous Humor.* By HENRY D. NOYES, M. D., New York. [Trans. Am. Ophth. Soc., 1870, pp. 104–108.]

One case is notable because the foreign body had remained two months within the eye, plainly visible by the ophthalmoscope, without causing any irritation.

The other case is remarkable from the occurrence of total detachment of the vitreous humor, after its conversion into connective tissue, while the retina remained in its proper relations, and but little diseased. The bit of percussion-cap which had caused this mischief had been in the eye sixteen months. A woodcut aids in the explanation of the lesion.

42.—*Foreign Body in the Eye diagnosticated by Limitation of the Visual Field.* By Dr. T. R. POOLEY, New York. [Trans. Am. Ophth. Soc., 1870, pp. 108, 109.]

The case was seen four hours after the injury. There was a wound in the upper and inner corneal margin, 3‴ long; the lens clear; blood prevented the use of the ophthalmoscope. Examination of the field of vision by a candle-flame discovered the upper and inner quadrant to be blind. On this symptom the presence of the foreign body in the eye was diagnosticated. This point was first brought forward by Dr. Berlin, of Stuttgart. Next day, severe inflammatory symptoms having set in, the eye was removed. A piece of steel was found in the lower and outer part of the eye, and around it was considerable hæmorrhage.

REFRACTION.

43.—*Apparent Form of Inverted Ophthalmoscopic Image of Optic Disk in Astigmatism.* By Dr. G. HAY, of Boston. [Trans. Am. Ophth. Soc., 1870, pp. 86–88.]

It has been stated that the inverted image of the optic disk of an astigmatic eye, viewed by the ophthalmoscope, is elongated, so that the long axis corresponds to the meridian of least refraction. Dr. Hay shows that this is not uniformly true; that the form of the nerve-image depends on the distance at which the objective lens is held from the eye. If we suppose the lens to be of three inches' focus, and held about three inches from the eye, the nerve will appear circular notwithstanding the astigmatism; that if the lens be held nearer than three inches, the image will be oval, and the long axis correspond to the meridian of least refraction; if the lens be held farther than three inches, the image will be oval, and its long axis correspond to the meridian of greatest refraction. This was shown experimentally by glasses, and is demonstrated in the article by mathematical formulæ.

44.—*A Remarkable Case of Triplopia.* By Dr. DUFOUR, of Lausanne. [Klinisch Monatsbl. für Aug., February, 1870.]

The patient was twenty years old, myopic ¼, at the age of twelve received a blow with the fist in the left eye.

This cornea was unusually large; pupil and lens decentred inward about one mm., and at temporal side of iris was a slit in the direction of the radiating fibres, by which light could enter the eye. The edge of the lens came to the middle of the slit. Rays would enter the eye, first, by the natural pupil; second, by the inner half of the slit, and, because of the myopia, they would cross in front of the retina, and give two images; third, rays would enter by the outer half of the slit, and not pass through the lens at all, but beyond its rim, and form a third image on the retina—hence the triplopia.

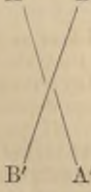
The interesting features of this case, and the alteration in the relative positions and distinctness of the images produced by various convex and concave glasses, are fully detailed. The changes caused by accommodation and by various prisms are curious. If a prism were held vertically before the other eye, then the patient saw four images.

45.—*A New Ophthalmoscope*, by Dr. E. JAVAL, is alluded to in the proceedings of the Académie de Médecine. [Gazette Hebdomadaire, May 6, 1870, p. 278.]

The mirror is a plate of glass covered by a thin layer of platinum, and the lenses which serve to correct the refraction of the patient or the observer are replaced by a small Galilean telescope. This, by a simple mechanism, is made to act as an optometer, and is exact as well as convenient. A greater magnifying power is attained by this contrivance than by ordinary instruments, while the remark is made that the instrument is capable of improvement in some details. It is a great desideratum to be able to correct hypermetropia and myopia, in all degrees, without the trouble of changing the glasses, and to gain a greater amplification of the fundus, and we hope this new ophthalmoscope may be perfected.

46.—*A New Method of Producing Stereoscopic Effect.* By LISTING. [Quoted in Zehender's Monatsblät., January, 1870, p. 29.]

This new experiment of Listing, who has already done so much in physiological optics, brings out stereoscopic effect with only one picture, which consists of figures arranged in a peculiar way, and seen with vertical double images. The simplest experiment is to view two lines crossing each other at an angle of about 30°, with a prism of 4° or 5°, its base vertical before one eye. No effort must be made to correct the vertical diplopia. If the prism be put before the left eye, its base upward, the line B B′ seems nearer to the eye than A A′. If the prism be turned with its base downward, and before the same eye, the line A A′ seems nearer, and B B′ more remote. I find with the base downward the prism must be weaker than when turned with the base upward. In gaining the effect by prisms so weak as these, no double vision is produced except for horizontal lines—the oblique lines appear to be only two. The same phenomenon may be produced in a common stereoscope by having two similar figures, and pushing one alternately up and down. Two rows of the same letters are arranged on a page like the limbs of the letter X, and viewed as above stated with a vertically deflecting prism; a sudden removal of one now takes place to a considerable depth, while this appearance is at once reversed on turning the prism



around 180°. These curious effects can only be produced and understood by means of the diagrams accompanying the article.

47.—*Do the Eyes perform any Rotation on the Optic Axes in Lateral Inclinations of the Head?* By Dr. Joseph Aub. [Archives of Ophthal. and Otol., vol. i., part ii., 659.]

By a method of experiment suggested by Dr. Knapp, Dr. Aub was able to prove that the eyes turn in the same way and to the same degree as the head when it bends sidewise—that is, the vertical meridians preserve their relation to the median plane of the head. This comprises in detail what was asserted by Donders twenty years ago.

48.—*The Influence of Spectacles on the Optical Constants and Visual Acuteness of the Eye.* By Dr. H. Knapp. [Archives of Ophthal. and Otol., vol. i., No. ii., pp. 377–410.]

Among the interesting deductions which are brought to light in this paper is the statement that "spectacle-glasses held half an inch before the eye do not change the situation of its anterior cardinal points, nor its anterior and posterior focal lengths, but the situation of each of the posterior cardinal points is altered in such a manner that convex lenses make them advance, and concave glasses recede by the same quantity. This result comes about, because the spectacle-glass occupies the place of the first focal point of the ocular system, which is 12.918 mm. from the surface of the cornea—and this is almost an exact half inch. The change of place of the second nodal point of course alters the visual angle and the apparent size of objects. This fact has long been understood with reference to normal eyes, and is of daily experience in presbyopia. But the author proceeds to discuss the effect of glasses on hyperopic and myopic eyes for purposes of distant vision. As these errors are due to shortening and lengthening respectively of the visual axis, the author assumes that the number of percipient elements is the same in hypermetropic, myopic, and emmetropic eyes, the difference being merely one of condensation or dispersion.

Taking this hypothesis for granted, it is shown that in hypermetropia and myopia glasses do not alter the visual angle, but do alter the size of the retinal image, because in hypermetropia, by advancement of the nodal point, the image covers more retinal elements than in emmetropia, and in myopia by the recession of the second nodal point the image covers fewer retinal elements than in emmetropia, these elements being crowded into a smaller area in hypermetropia, and scattered over a larger area in myopia. The degree of visual acuteness proper to various degrees of hypermetropia and myopia is next calculated, and put into tabular form—the distance being given at which Snellen XX should be read when the myope or hypermetrope is armed with suitable glasses, and showing how much should be added to the average reading-distance for hypermetropia, and how much may be subtracted from it in myopia, and still vision be reckoned normal.

In comparing Dr. Knapp's figures with some examples given by Mauthner, page 227, in which he calculates the length of the visual axis for ametropia, some discrepancies are to be seen; and if Dr. Knapp's table on page 397 be compared with Dr. Loring's in the *American Journal of Medical Sciences* for April, 1870, page 335, and which is calculated from Mauthner's formulæ, there will be found to be scarcely any agreement between them. Dr. Knapp asserts that the amount of displacement forward or backward in equal degrees of hypermetropia or myopia is the same. Dr. Mauthner, and after him Dr. Loring, figures out decided differences. Thus, says Dr. Loring, H½ equals a shortening of the visual axis of 3.96 mm.; M½ equals

a lengthening of the visual axis of 8.6. Dr. Knapp says that both H½ and M½ indicate a shortening or lengthening of the visual axis of 5.4544mm. Evidently some mistake has been made in somebody's calculations.

Dr. Knapp's assumption that hyperopic eyes contain the same number of percipient retinal elements as do emmetropic eyes may be well enough admitted for his purposes; but, as hyperopia is an arrest of development, and, when of great degree, is accompanied by a decided amblyopia, we may be justified in suspending our acceptance of the assertion he makes until anatomical investigation has proved it. Of course, the only mode of proof is by counting the number of rods and cones in a given area of an emmetropic eye, and also of a hypermetropic eye.

The whole paper is interesting, and masterly in its discussion, and concludes by giving similar calculations for visual acuteness in eyes operated for cataract, and furnished with suitable glasses.

49.—*An Additional Test for the Diagnosis and Correction of the Optical Defects of the Eye.* By WILLIAM THOMPSON, M. D., Philadelphia. [Am. Journal of Medical Sciences, January, 1870, pp. 76–80.]

An Additional Method to determine the Degree of Ametropia. By WILLIAM THOMPSON, M. D. [Am. Journal of Medical Sciences, October, 1870, pp. 414–420. Transactions of American Ophthalmological Society for 1870.]

The above papers relate to the experiment, first made by Scheiner, in 1619, by which an object, seen through two or more small holes in close proximity, forms a double or multiple image on the retina in case the retina is not placed accurately at the focus of the refractive media. Scheiner called attention to this in reference to the function of accommodation; Dr. Thompson shows how the same fact may be made to apply to the diagnosis of errors of refraction in general. He puts in front of the eye a blackened screen perforated with pin-holes one-eighth of an inch apart, and views a gas-flame as an object. If the eye be in any sense ametropic, the flame appears double: by putting a red glass over one hole, say the right, the red flame appears in hypermetropia to be on the left side, in myopia on the right side. The object is placed at a distance, and in hypermetropia the accommodation must be relaxed. As Dr. Thompson remarks, this method becomes practical in the case of extreme amblyopia, where test-types may not be distinguishable. In these cases, however, we may reach the diagnosis by the ophthalmoscope. A special case alluded to, in which there was considerable opacity of the lens, making diagnosis by the ophthalmoscope unreliable, does afford scope for the exercise of Dr. Thompson's ingenious suggestions. But we can scarcely believe that they will very often be resorted to.

In the second paper the method is more fully wrought out, and a simple rule of calculation is given, by which the distance of separation of the double images affords the means of deciding the degree of ametropia, and prescribing glasses. This is applied to astigmatism as well as to other refractive defects. The calculation is easy, and the elements are only those of simple proportion. A patient sits at five metres, about seventeen feet, from a gas-light turned low, he looks through two holes, in a disk placed close to his eye, which are five mm. in diameter and four mm. apart. He sees two flames; the surgeon, placing himself by the gas-light, brings a candle-flame into a position coinciding with the false image, and measures its distance from the gas-flame. Take a case—a patient operated for cataract saw the double lights ten inches or 250 mm. apart; his glass is obtained by the problem $\frac{5.0}{2.5}\frac{x}{6} = 80$ mm. The distance of patient from the object,

5,000 millimetres, multiplied by the distance between the perforations, viz., four millimetres, and divided by the separations of the images he sees, gives the needful glass, whose focal length is 80 mm. or 3.2 inches. The distance of the nodal point from the spectacle-frame, which is half an inch, must be allowed for.

That this method of determing ametropia will supersede the usual test-types and glasses the author does not expect, nor do we see that it is likely to have a considerable degree of utility, but we must commend the success of the endeavor, and the ingenuity of the devices employed. It is at any rate an interesting study in physiological optics.

RETINA AND OPTIC NERVE.

50.—*Upon the Termination of the Optic-Nerve Fibres in the Retina.* By Max Schultze. [Archiv. für Microscop. Anatom., Bd. v., pp. 379–403.]

The chief point is the discovery of minute hair-like fibres standing on the outer surface of the membrana limitans externa. They are seen with a magnifying power of one thousand diameters, and lie between the rods and cones. Max Schultze thinks they may be the terminal portions of the optic-nerve fibres, and be in connection with the primitive fibrillæ into which he finds the inner members of the rods and cones divisible.

51.—*Upon the Macula Lutea of Man and the Ora Serrata of some Mammalia.* By Dr. Fr. Merkel. With 2 plates. [Leipsic, 1870, pp. 20 in 4to.]

52.—*The Light Streak seen in the Centre of the Retinal Vessels with the Ophthalmoscope.* By Dr. E. G. Loring, New York. [Trans. Am. Oph. Soc., 1870, pp. 122–128. With 2 woodcuts.]

The explanation hitherto given of this light streak, and which has been generally accepted as it is stated by Jaeger, is that it is the effect of reflection from the column of blood in the vessel. Dr. Loring, by a simple apparatus of a glass tube filled with red fluid, placed at the bottom of a box, demonstrates that the light streak does not come by reflection from the column of fluid, but by reflection from the surface behind the tube, transmitted through the fluid. As the surface behind the tube has greater or less reflecting property, the light streak is more or less intense or is wanting. The apparatus imitates sufficiently well the conditions which exist in the fundus oculi, and makes his reasoning clear and indubitable.

The absence of the light streak in the choroidal vessels is stated by Jaeger to be due to the greater thickness of the walls of these vessels, by which their transparency is abated so much that they become visible as opaque objects in their entire diameter. This explanation agrees equally with Dr. Loring's explanation—it being conceded that the walls of the retinal vessels are so thin as to be practically transparent. It is readily understood that, where the blood is very dark, the reflex must be diminished, although perhaps not abolished—hence the fainter streak seen in the retinal veins.

53.—*The Channel by which in Cases of Neuro-Retinitis the Exudation proceeds from the Brain into the Eye.* By Dr. H. Knapp, New York. [Trans. Am. Oph. Soc., 1870, pp. 118–120.]

While the anatomical studies of Schwalbe and Schmidt have shown us that exudation may travel along the intervaginal space of the double sheath of the optic nerve from the arachnoid to the lamina cribrosa, Dr. Knapp makes a further suggestion as to its progress into the interior of the eye. He thinks it percolates through the lamina cribrosa and spreads out into and around the head of the nerve. Finding extreme neuro-retinitis in

two cases of brain-disease with very little damage to sight, he measured the size of Mariotte's blind spot and found it increased in one patient two and a half times, in the other four times its proper size. To quote the words of the article:

"This enlargement of Mariotte's blind spot can, to my mind, only be explained thus: The exudation—fluid and white blood-corpuscles—travels from the arachnoidal cavity into the inter-vaginal space, oozes through the periphery of the lamina cribrosa, and expands into the soft tissues around the margin of the optic disk, the suprachoroid, choroid proper, and retina. The optic-nerve fibres of the latter, situate farthest from the origin of the exudation, will be attacked least and last. The rods and staves, however, the percipient layer of the retina, will be affected sooner, and have their function either destroyed or, in case of recovery, kept in abeyance. The enlargement of Mariotte's blind spot, which I found to correspond to the extent of the exudation visible with the ophthalmoscope, proves this conclusively. In addition, I may strengthen this theory by the following facts: The rods and staves are delicate organs, and more easily destroyed than the nervous fibres. The exudation, seen through the ophthalmoscope, has its summit at the margin of the optic disk. Extending in both directions, between the fibres of the optic-nerve entrance, and into the choroid and retina, the most destructible parts it meets on its way are the rods and staves, the nutrition of which, moreover, is dependent rather on the choroid than on the retina. If the exudation passed through the optic nerve itself, there would be, in consequence of a like pressure on *all* the nervous fibres, an equal diminution of visual acuteness over the whole field of vision. The anatomical study of specimens alone can fully explain this process. But since this has not yet been done, and specimens are exceedingly difficult to obtain, I thought it well to present my views on this subject before the members of this Society, thereby calling their attention to it, in order that no opportunity may be lost, both with regard to the clinical observation and the anatomical investigation of neuro-retinitis."

54.—*Some Curious Phenomena resulting from Reflex Nervous Action in consequence of Traumatic Lesion of the Eye.* By Dr. C. A. Robertson, Albany. [Trans. Am. Oph. Soc., 1870, pp. 110–113.]

A man, aged forty-one, received a severe blow on the left eye at the time when Dr. Robertson saw him. Staphyloma of the sclera and cornea had formed, globe very hard, cornea insensitive to touch, very little pain—no perception of light. After two months, staphyloma increased greatly, and spontaneous rupture took place, and was repeated two or three times afterward. Patient refused enucleation. After several additional months, Dr. Robertson was called to see him, suffering from symptoms thought to be precursory of typhoid fever, or due to some kidney-trouble.

"The patient was exceedingly weak, and without appetite. Pulse was full and soft; skin moist; but sometimes (as stated to me) dry and hot; tongue moist, coated white; urine scanty and bowels constipated. A frequent twitching or spasm of the body occurred. Expression of the face dull, almost stolid. The fingers of one hand were constantly rubbing or working on the *ala* of the left nostril. Patient made no remark, except when questioned, or when startled by a sudden noise. In answer to question, he said his eye did not hurt him, but he had darting-pains in the head. The staphyloma was larger than I had seen it before. His manner was listless, and his mind enfeebled rather than delirious, although he was sometimes decidedly delirious at night, as his wife stated. He would wake frequently, as if from a frightful dream, and spring up excitedly in bed, trembling with terror, and it would be long before he regained his com-

posure. Even when awake, and in the daytime, a sudden noise in the house or street would startle him and make him exclaim, while shaking with fear, 'What's that?'

"On consulting with the attending physician, I stated my opinion to be that all the symptoms were due to perverted action of the reflex nervous system, and that the diseased eye was the exciting cause of all this perturbation. I urged the immediate abscission of the front of the globe, since the patient had previously refused to have the entire ball removed. He smiled at what seemed to him the absurdity of my opinion. He concurred with me that the eye was a hideous deformity, and that the patient could endure an operation for its removal, and with that view he would not oppose an operation as an experiment to confirm or subvert my opinion. Accordingly, chloroform was procured and the patient anæsthetized. A liberal abscission was made, according to the method of Mr. Critchett, of London.

"All perverted nervous action ceased after the operation. During the first night the sleep was refreshing and but little disturbed. In a week after removal of sutures the patient came to my office to show himself, having travelled eight miles. All local irritation had subsided, and an excellent stump existed for the support of an artificial eye. He called himself a well man.

"The nervous phenomena of this case are exceedingly interesting. From the appearances presented by the eye, it was evident, as before said, that the chief violence of the blow was expended upon the superior portion of the ciliary region of the eyeball, and not upon the brow. The iris and ciliary region, and to some extent the cornea, are supplied by filaments of distribution from the ophthalmic or ciliary ganglion of the great sympathetic nerve, situated on the outer aspect of the optic nerve in the posterior chamber of the orbit. A few of the ciliary nerves are derived from the naso-ciliary nerve. This ganglion serves as a medium of connection between the trifacial (branches of which are largely supplied to the cornea) and the oculomotor, or third pair. The nasal nerve is a branch of the frontal, and, besides its ciliary relations, is also joined by a filament of the sympathetic.

"These nervous connections will account for the irritation about the nose, the head-pains, and the cerebral symptoms, while the spasms and other constitutional disturbances were doubtless caused by irritation of terminal branches of the great sympathetic nerve."

55.—*Pulsation of the Vena Centralis Retinæ in Cases of Epilepsy and kindred Affections.* By Prof. Köstt and Dr. Niemetschek. [Vierteljahrschrift für die praktische Heilkunde, part ii., pp. 81–93, part iii., pp. 1–50, 1870.]

This article purports to be an extract from a work upon the uses of the ophthalmoscope in appreciating diseases of the insane. It consists of a series of thirty-six observations recorded in detail, followed by conclusions drawn from these and other cases, which amount to 250 individuals and 468 eyes examined.

The cases given in detail are well stated, and the ophthalmoscopic examination shows familiarity with the instrument. The degree of vision is seldom noted, and the visual field appears not to have been attended to. In many patients it would not have been possible to ascertain these facts, but it is certainly desirable to have them. Forty-six closely-printed pages are devoted to the detail of thirty-six cases, which we cannot attempt to analyze. In all of these, and in sixty-six eyes, there was a venous pulse. The cases are put into three categories: 1. Twelve who were decided

epileptics and maniacal as well. 2. Seventeen having clear epileptiform symptoms. 3. Seven in whom these symptoms had existed, and passed away.

Out of the thirty-six cases, four had opacities of the lens, and eleven were hyperopic—a defect of development which in this connection has special meaning. The optic disk showed no alteration of form in fifty-four cases; in nine it was oval, five times vertically, four times transversely—the oval shape in some cases produced by astigmatic refraction. In twelve eyes the nerve was excavated to a greater or less degree, and in this circumstance there is no special importance. Anomalies in the color of the nerve deserve careful attention. Its normal hue the author calls a grayish red and this is deeper on its nasal side, because the fibres and capillaries are thicker than on the outer half. In anæmia the outer or temporal side of the nerve becomes more pale and transparent, so as to permit us to discern deeper parts, as the lamina cribrosa. In six cases only one-half of the nerve, and in nine cases only one-third of the nerve, exhibited the proper grayish red. Most of these patients were strikingly anæmic. In five of these fifteen cases there was goitre, and the large supply of blood going from the carotids into the thyroid gland abates materially the quantity furnished to the brain. In other cases the force of the intra-cranial circulation was weakened by heart-disease, such as stenosis of the aorta, dilatation of the ventricle, feeble contraction, etc. From these facts the author concludes that epilepsy results from anæmia of the brain. Loss of consciousness first takes place, then spasms, irritability, and perhaps maniacal seizures. This stage implies cerebral hyperæmia, which may become so great as to cause fatal sopor, as in case three. Now, while in the anæmic condition the optic nerve is pale, in the subsequent stage of cerebral hyperæmia it grows red. In a few patients the nerve was gray or even white—one was an old epileptic, and two had indications of cerebral atrophy.

Another symptom to which the authors call attention is the succulence of the retina. The glistening reflex which appears in young children, and in some robust adults, and especially the silvery elliptical areola which surrounds the bright red fovea centralis retinæ in such persons, is said to be due to the abundance of fluid in the tissue. The absence of this lustrous reflex indicates a lack of moisture, and in only ten cases was its presence seen. These were young, but decidedly anæmic; and this feature was in some noticed during the stage of reaction and consequent turgescence. It is stated to be characteristic of incurable epilepsy to find enlargement of the central retinal arteries, narrowing of the veins, and absence of retinal reflex. One patient examined *during an attack* exhibited slight enlargement of the arteries, extreme thinness of the veins, and disappearance of the retinal reflex. At previous inspections of this patient, the veins were moderately large; and one seems warranted therefore in putting the emptiness of the veins and collapse of the retina into close relation with the unconscious stage of the attack. A frequent repetition of this state leads to pigment maceration of the choroid. The retinal arteries and veins are found in various and usually opposite conditions; that is, arteries large and veins small, or arteries small and veins large—the former state indicates an obstinate and severe disease, the latter, belonging to the reactive period, has a relatively better prognosis. Where, as in some cases, both arteries and veins are large, the circulation is becoming healthier. Small arteries and small veins indicate anæmia with regressive metamorphosis.

Pulsation of the retinal veins is the symptom which this article makes most prominent. It can be caused in every eye by gentle pressure with the finger. The vein widens with the heart systole, which is the time of arterial diastole. Pressure on the eye hinders arterial circulation, and favors venous outflow. Every thing which abates the pressure on the internal carotid may give occasion to venous pulse. In the cases cited, this

may originate in general anæmia, or in some local cause which favors anæmia of the head. Whatever promotes venous outflow from the head increases cerebral anæmia, and therefore a deep inspiration makes a venous pulse stronger. When pressure on the eye puts an entire stop to the arterial circulation, the retina can no longer see—every thing becomes dark. The effects of prolonged pressure are well seen in glaucoma.

"Anæmia of the whole eyeball is seen in pallor of the papilla, anæmia of the retina in venous pulsation; increased pressure is shown in arterial pulsation."

Venous pulse did not occur in both eyes, in all the thirty-six cases; in twenty it was stronger, or present only in the left eye. No reason is assigned for this preponderance.

The conclusions of the paper are put into the following four statements:

1. Venous pulsation appears when, by pressure either from within or from without, the eye is made anæmic.

2. Anæmia of the eye, whose special manifestation is pallor of the papilla, may occur from general poverty of blood, or from imperfect filling of the internal carotid; from both causes a venous pulse may take place. Hence this phenomenon appears in epilepsy and kindred affections, which depend on cerebral anæmia.

3. Diminution of circulation impairs the nutrition and function of an organ. In slight degrees of brain-anæmia, patients suffer temporary obscurations of sight, giddiness, and loss of consciousness.

The more serious the anæmia, the greater the debility of the organ. The eye loses sight, the brain loses sensation, will, and thought. Nothing but a reëstablishment of the circulation can restore the organ to its function and prevent death.

4. Hence in anæmic persons we may find the papilla reddened, the retinal veins turgid, and the retinal tissue swollen. This is the hyperæmia which succeeds to the anæmic state. In slight degrees of this reaction we have pain, spasms, increased irritability, and excitement. In higher grades we have general convulsions, exaltations, hallucinations, and mania. The man is then insane.

56.—*The Simultaneous Occurrence of Aneurisms in the Retina, and Enlargements of the Small Arteries of the Brain.* By Dr. Henri Lionville. [Gazette des Hôpitaux, 36, 1870.]

The above lesions were noticed by Bouchard and Charcot in 1868, afterward by Bouchereau and Magnan, and another similar observation is now made by Lionville in the person of a woman, seventy-two years old, who died of apoplexy. The vessels of the brain were atheromatous, and innumerable miliary aneurisms were found in the vessels of the cerebrum, cerebellum, and meninges. In the retina, similar dilatations were found, from the size of a grain of powder to a large pin-head; the smallest required a magnifying power of ten to twenty times, to be seen by the naked eye. These lesions may be put alongside of retinal apoplexies, in their significance as to the state of the cerebral vessels. They have not yet been seen during life by the ophthalmoscope, but may perhaps be observed.

57.—*Two Cases of Embolus of the Arteria Centralis Retinæ.* By Dr. L. Grossman, Pesth. [Vierteljahrschrift für die praktische Heilkunde, Band ii., 1870, s. 94–100.]

58.—*Asthenopia and other Ocular Affections produced by Petroleum-Light.* By Prof. Cesare Paoli. [La Sperimentale, xxv., 2, p. 108, 3, p. 223, 1870, Schmidt's Jahrb., B. 147, 7, 432.]

Without quoting the theoretic reasons given for the alleged hurtful

effects of petroleum as a source of light, some of the cases may be repeated which are given in proof. All have the character of retinal hyperæsthesia. The first, a young French student who was thus attacked, is not so undeniably to be referred to this cause as to be received without hesitation. He simply had extreme intolerance of light, and impaired vision, how much impaired is not stated. By ophthalmoscope, the fundus appeared pale, the arteries and veins very thin, nerve normal. After two years the patient was in a measure restored, so as to read fifteen to twenty minutes at a time. His treatment consisted in iron, cold water to the eyes, gymnastics, sea-bathing, travelling, etc.

The second case or group of cases respects six girls who were accustomed to sew together in the winter evenings by a very bright petroleum-lamp. For two months none had any trouble, then two who worked the longest were attacked by severe asthenopia; they could fix upon a near object for only a few minutes at a time, and could not work at all in the evening. Two others were affected with similar retinal symptoms, though in a less degree; a fifth had conjunctival and retinal congestion, only one entirely escaped. The entire giving up of work by petroleum-light procured recovery after several months.

3. A student of mathematics, of delicate structure, worked at night by a large petroleum-lamp. After a time he found that he could not see as well as before, and added another lamp, until he became unable even to discern large objects—on a cloudy day he could not walk the street alone. The eyes were externally of normal appearance, the pupils a little enlarged—conjunctival vessels slightly varicose. The optic nerve was congested; the veins much distended, and the blood seemed as if coagulated in them; the arteries enlarged. By confinement for several weeks in a dark room, the patient was restored.

59.—*A Case of Retinitis Leucæmica*, by Dr. M. Roth. [Virchow's Archiv, Band 49, pp. 441–446.]

A man, aged fifty-five, died with marked sign of leucæmia, and his eyes had during life been examined by Prof. Schirmer with the ophthalmoscope. There was no impairment of sight, but still there was decided retinitis, with gray exudation, and a few apoplexies; the color of the eye ground and of the retinal veins was quite normal.

At the examination of the retina, *post mortem*, the exudation was found to be due to hypertrophy of the fibres of Müller in the external fibrous layer and their granular degeneration. At a few spots there were hypertrophied nerve-fibres. In the periphery and in the outer layers were numerous small extravasations. The choroid extremely hyperæmic; the large vessels charged with masses of white blood-corpuscles, the capillaries contain about equal parts of red and white blood-disks. Rods and cones well preserved. The vessels in the periphery of the retina had undergone fatty degeneration to a great extent. The lymphoid infiltration of the retina and chorid was precisely like the lymph-cells in the vessels, and a process of emigration was the most natural suggestion.

60.—*The Similarity between the Neuro-Retinitis produced by a Cerebral Tumor and by Bright's Disease.* By Dr. Herm. Schmidt and Dr. Wegner, Berlin. [Archiv f. Ophthal., Bd. xv., Abth. 111, s. 253–275.]

Two cases are fully detailed, which are of themselves highly important, but whose value is greatly enhanced by their comparison with each other. Both cases were fully observed during life, and the appearances, *post mortem*, were studied in a thorough and competent manner. The broad facts are that a girl, aged twenty-three, exhibited in both eyes the appearances

which belong to the most complete picture of Bright's disease, had no albumen or other evidence of kidney-trouble, and not until a short time before death had she any symptoms to cause suspicion of brain-trouble. The autopsy disclosed a tumor at and in the region of the septum lucidum. Another girl, aged fifteen, had the same ophthalmoscopic symptoms, with clear signs of Bright's disease, and, having died, gave opportunity for microscopic examination of the retina and optic nerves.

The features common to both cases, in the ophthalmoscopic picture, were great swelling of both optic nerves, redness and infiltration, edges indistinct, vessels swollen—in the case of tumor there was ecchymosis of one papilla; near the nerve, opaque white patches of the rounded form, and dotted edges, seen in nephritic retinitis; at the macula the usual radiating figure, extravasations of blood in various places. Both cases were as similar as two cases of the same disease could be, and were studied by Graefe and others.

In the tumor patient, the ocular lesion was confined strictly to the eye—the optic nerve-trunks, close up to the globes, possessed a normal structure as seen by the microscope. The lesions in the retinæ in both cases were extremely alike, making the diagnosis by the microscope almost as impossible as by the ophthalmoscope. There were in both cases sclerosis of the fibres of the optic-nerve layer—the ganglion cells atrophied or sclerosed—the granular layers studded with or almost transformed into fat granule-cells—hypertrophy of the connective tissue of the nerve and retina—blood-disks, and brownish pigment—the choroidal vessels were somewhat sclerosed. The only difference in the two cases was that, in the patient with cerebral tumor, the swelling of the retina belonged more to hypertrophy of the inner retinal layers and papilla, while in the patient with Bright's disease the swelling affected principally the radiating fibres of the external granular layer. In neither case could the rods and cones be well examined, because of cadaverous changes.

The amount of the matter is, that we cannot any longer assert the infallibility of diagnosticating Bright's disease by the ophthalmoscope. Many good observers have denied the possibility of mistake, and have recorded their opinion (*vide* Liebreich, Mauthner, etc.), but the retinal pictures may be completely simulated by neuro-retinitis from cerebral tumor, and from diabetes mellitus. Graefe records a case of cerebral tumor producing the retinal lesions in question (Archiv f. Oph., B. xii., 2, 120), and states some minutiæ for differential diagnosis, but these points are renderd valueless by the two observations above recorded.

We are therefore compelled to examine the urine as well as the eye, and to study the signs of cerebral disturbance, however obscure they may in some cases be. But it remains true that the retinal lesions do belong in the large majority of instances to Bright's disease. A point to be studied is, what causes the neuro-retinitis in some cases of Bright's disease?—Can there be any analogy to the incarceration which belongs to the pathogenesis of the *Stanung's papilla* in neuritis descendens?

61.—*Acute Neuritis Optica from Tumor of the Brain—Autopsy.* By Dr. Schiess Gemuseus. [Monatsblätt. f. Augenheilkunde, viii., p. 100, April, 1870.]

A silk-dyer, forty-three years old, after a fit of anger, was seized in August, 1868, with heat in the head, mental excitement, and epileptic convulsions. His memory grew feeble, he had occasional headache, and toward the close of the year the epileptic attacks returned—his legs became weak, he fell into apathy, and complained of frontal pain. He would answer a question only after a long pause; there was slight ptosis of the left eye; hearing of the left ear had been defective for years, and he had had a blow

on this side of the head four years before. His eyes were examined in January, 1869, by the ophthalmoscope, although his vision was perfect. The examination, which was very troublesome, revealed in both eyes extreme œdema of the papilla and its surrounding parts, besides small extravasations. Soon after, the patient died. The section showed in the skull roughness of the inner surface of the bones, especially in the right middle fossa. The right hemisphere tense, the convolutions flattened, the falx pushed to the left side, the left ventricle enlarged, the right narrowed. A tumor grew from the apex of the right anterior lobe, reaching back to the limit of the posterior lobe, which proved to be a sarcoma partially softened, and with some recent and old apoplexies. The optic papillæ were elevated to a prominence of 1½ mm., the optic fibres in the retina were spread asunder by abundant growth of connective tissue—at the borders of the swelling were masses of fatty degeneration—there were no new vessels developed. There is no account of the state of the orbital portion of the optic nerve. This case adds to the observations already become numerous, where intracranial disease produces visible changes in the fundus oculi without causing injury to sight.

62.—*On the Mode of Occurrence of Neuritis Optica Intraocularis (Stanung's Papilla) in Cerebral Disease.* By Dr. Herm. Schmidt, Berlin. [Archiv für Ophthal., Bd. xv., Abth. 2, s. 193–197.]

In view of the anatomical fact stated above, and of the relations between the arachnoid cavity and the sheath of the optic nerve, to which Schwalbe has called attention, Dr. Schmidt attempted to discover how the head of the optic nerve becomes swollen from intra-cranial pressure. He removed a small piece of the skull and dura matter from an animal which was bled to death, and then injected a solution of Berlin blue, with slow and steady pressure, into the arachnoidal cavity. The coloring matter passed freely into the space between the outer and inner optic-nerve sheath, but never penetrated between the fibres of the nerve-trunk. When the nerve reached the globe the fluid was in greater quantity, but did not extend to the connective tissue about the sclera, nor into the space between the choroid and sclera. It did penetrate directly into the lamina cribrosa, making this tissue a deep and brilliant blue, but not coloring the head of the nerve. Thus a direct communication is proven between the arachnoidal cavity and the net-work of the lamina cribrosa, by which pressure of fluid may be conveyed, and in consequence the head of the nerve suffer strangulation, while the rest of the trunk may be unaffected.

In case the communication between the nerve-sheath and the arachnoid should, by a tumor or adhesive inflammation, or otherwise, be closed, we might have, instead of the œdematous papilla, simple atrophy of the nerve.

63.—*Case of Temporary Blindness, in a Young Man.* By Dr. J. Hirschberg. [Med. Chir. Rundschau, Mai, 1870.]

A young man, eighteen years old, who had recently had gonorrhœa and afterward angina, became suddenly blind during the night of November 19th. For two days he had complained of severe headache, which was much worse on that night. His vision was reduced to mere perception of light; the pupils, of medium size, acted slowly in response to light. The optic nerve and fundus entirely normal. The urine contained a noticeable quantity of albumen. There were no other symptoms.

The artificial leech was twice applied to each temple, a decided purgative administered, and mercurial treatment begun. By the succeeding night the patient stated that he could see again, and on the following day vision was fully restored, and the pupils became again actively contractile.

64.—*Anæsthesia of the Retina.* By Dr. A. Sichel. [Annales d'Oculist., t. lxiii., Mai et Juin, 1870.]

Two cases are reported, the first elaborately and the second briefly. The author regards this condition of retinal anæsthesia as not due to want of perception in the special sense, but want of appreciation by the brain. The disease begins suddenly after some violent mental or moral impression. It attacks persons of a nervous or hysterical temperament. The eyes present no abnormal appearances either within or without. Sight ranges from moderate amblyopia to utter blindness. The visual field exhibits the greatest possible variety of form, as the accompanying cases show. Cutaneous anæsthesia and hyperæsthesia occur in various parts of the body. The disease is obstinate and wearisome, but usually ends in recovery. The most interesting case is the first, viz.:

A merchant, aged twenty-eight, very near-sighted, had an attack of blindness in the right eye in 1856, which lasted a year and a half; another attack in 1861, lasting eight months; and in the autumn of 1868 a third took place. While on a pleasure-excursion in the country, he was overcome by the extreme heat—the next day was taken with loss of consciousness, vomiting, and diarrhœa—five days afterward violent headache took place, quickly followed by injury to sight. The right eye totally blind, the left partially; reads Jaeger 1 at seven centimetres (less than three inches.) The left visual field notably contracted above and below. The next day the field had contracted inward and outward, and slightly expanded upward and downward. The remarkable and fantastic variations in this respect are indicated by no less than seventeen diagrams, taken during a period of nine months. For most of the time it was central and very small—for instance, in January it measured, at thirty-five centimetres' (about fourteen inches) distance from the point of fixation, less than three inches vertically, and a little less horizontally. The perception of color was defective; sometimes he would recognize only yellow, and all other tints would appear green; again, he would call carmine orange, at other times all deep tints appeared black, and light ones gray. In snow light he saw prismatic colors, blue, red, etc. There was anæsthesia of the skin of the knees, the elbows, and of the right lumbar region: and hyperæsthesia in the right orbital region, in the left lumbar region and shoulder; sometimes the pain in the right orbit was exquisite, and accompanied by most severe photophobia. At a later period there were insomnia, loss of memory, perversion of all sensorial functions, extreme sexual propensity. The case was seen by Prof. Graefe, who agreed with the diagnosis of retinal anæsthesia. The treatment consisted in the use of tonics and nervines, hydrotherapeutics, change of scene, fresh air, abundant exercise; the oxide of zinc was tried, at Graefe's suggestion, half a grain to two grains, three times a day. Finally, the patient recovered perfect sight and health. The intra-ocular symptoms were negative, except pallor of the nerve.

A second case, in a young woman twenty-six years old, presented features similar to the above, and recovered in three months.

65.—*On Color-blindness in Diseases of the Eye, and Remarks on Certain Forms of Amblyopia.* By Dr. Th. Leber. [Achiv für Ophth., Bd. xv., Abth. iii., s. 26–107.]

The ability to discern colors is injured in various affections of the eye, and has been a matter of attention by many observers, but we yet do not possess exact information on its relation either to the healthy or morbid states of the organ of sight. The most common cases in which this defect appears are those of atrophy of the optic nerve. Dr. Leber has investigated thirty-six cases of this kind, all of which had amblyopia and limitation of the

visual field, and in all but three there were anomalies in the perception of color. This defect occurs under every form of nerve-atrophy, the simple, the inflammatory, and the glaucomatous, as well as in every degree of amblyopia. Even where sight is not much injured, color-blindness may be very marked. The prognosis of the nerve-affection is not modified for better or for worse, by the loss of color-perception. The color to which patients are most frequently insensitive is red, while blue is best preserved: green appears yellowish or gray; rose and violet, bluish; yellow commonly appears yellow. In the later stages of the malady only the bluish shades are apt to be recognized, all others appearing whitish, gray, or dark. This corresponds closely with what is true of the normal eye during deep twilight.

In three cases of *hemiopia* there was no defect of color-perception in the sound half of the field. In one of these cases vision was nearly restored, but on the blinded side the color-sense remained defective. Quaglino and Boys de Loury published each a case of hemiopia in which there was absolute color-blindness for the remaining field.

An extremely interesting class of cases are those of amblyopia and central scotoma without ophthalmoscopic lesions. The amblyopia occurs without central scotoma; and in three cases there is little derangement of the perception of color. Out of twenty-one cases of amblyopia without scotoma, only three were unable to distinguish red. These patients acquire their amblyopia from abuse of alcohol, tobacco, and other toxic substances, a few from anæmia and mal-nutrition. The truth of this assertion appears from the fact that, out of eighty-one cases of amblyopia, in which there were no ophthalmoscopic lesions and no central scotoma, there were seventy-five men and six women.

But cases of amblyopia without visible lesion, but with central scotoma, present marked impairment of sense of color. At an early stage of these cases is to be found sometimes a faint, striated haziness of the border of the papilla and neighboring retina, which resembles syphilitic retinitis, but, unlike the latter, extends only a little distance into the retina. Twice there were evidences of diffused retinitis; in several cases there were isolated hæmorrhages; but generally no changes could be seen by the ophthalmoscope. At a later period the papilla is apt to show alteration of tissue in pallor or slight bluishness of its outer half—a sign of partial atrophy at least in some of the cases. Of this class of cases fifty-six were seen, and in thirty-one the perception of color tested; of which in all there was a discernible impairment. So uniform was this fact that it may be taken as a means of diagnosis of the existence of central scotoma. The cases may be subdivided into several categories: 1. Central scotoma not demonstrable by the usual test, but only by the loss of color-perception, while the periphery of the retina is able to recognize colors—eight cases. 2. Scotoma may be determined in the usual way, and only within its limits is the sense of color impaired, while in the periphery the sense of color continues—nine cases. 3. In the scotoma there is absolutely no perception of color, and in the periphery there is a slight impairment, while eccentric vision is perfectly good—fourteen cases. 4. Another set of cases not coming under the class we are considering are those which have, in addition, impairment of eccentric vision, and which pass over into nerve-atrophy; of these there were three, and were not included in the above thirty-one. These several categories are not to be sharply defined, but shade into each other, and often advance from one to another. For example, a scotoma which at one period was only to be made out by the color-test, may afterward be manifest to ordinary examination. The third class are usually the most unsatisfactory, and belong to an advanced stage of the disease, when prognosis is unpleasant.

A peculiar form of amblyopia is that in which there is central scotoma, outside of it, a zone of nearly normal perception and the periphery affected by color-blindness. A case of this condition in both eyes is given; but the patient did not remain for treatment.

Central scotoma generally affects both eyes, though to unequal degrees, and simultaneously. It is a disease of men almost exclusively—there have been but three women to fifty-three men. It affects those above twenty years of age, and increases in frequency to forty years. Abuse of alcoholic drink and of tobacco-smoking are often to be assigned as causes, while exposure to cold and wet also have a part. In one case there was syphilis, and in another it was also the probable cause.

There are strong reasons for believing that the seat of the disease is not in the retina nor the brain, but in the trunk of the optic nerve between the chiasm and the globe, and that it is a veritable neuritis. This is not to be asserted of all cases, such as amblyopia potatorum, where hyperæmia and nutritive disturbance of the nerve-elements are to be supposed. In the case of neuritis it is to be assumed that only a part of the nerve is inflamed or atrophied. There are anatomical and pathological reasons for the assertion that the fibres which go to the rods and cones at the macula lutea are situated on the superficial parts of the nerve-trunk and those which belong to the periphery lie nearer the centre of the nerve. A perineuritis would, therefore, explain the symptom of central scotoma.

The results of treatment are always much less favorable in amblyopia with central scotoma, than in amblyopia without scotoma. If the color-blindness reach to the periphery of the field, and the nerve show manifest signs of atrophy, treatment will be almost fruitless. The therapeutics must be suited to the state of the individual, but in general they are blood-letting, sudorifics, purgatives, and tonics. In some cases iodide of potassium in small doses has proved of unexpected value after other things had been tried in vain. The scotoma in amblyopia potatorum is more obstinate than in other cases. Entire blindness is not to be feared in even bad cases, if the visual field remain perfectly free for a long time.

A disease wholly differing from the above is acquired color-blindness without amblyopia. Such cases have been described in literature before the use of the ophthalmoscope by Wartmann, Ruete, Mackenzie, Tyndall, and others. One case has fallen under my own notice, in a merchant, twenty-one years old, who was employed by a silk manufacturing firm, and discovered that in a brief time his power of discerning shades of color was abolished. He called light-green, yellow; dark-gray violet, red; scarlet and brown, green; red, gray; while some tints of green, blue, and yellow, he gave correctly. Visual acuteness normal, fundus normal, rather darkly pigmented. A second examination, two years later, gave almost the same results. The color-blindness embraced the whole field; there was no scotoma whatever; could read Jaeger from four seconds to one minute fluently. Probably the seat of the disease was in the brain.

66.—*Tumors of the Retina.* By Dr. Edward Delafield, New York. [Trans. of Am. Oph. Soc. for 1870.]

In this paper, which gives the results of a careful study of five cases of intra-ocular tumors, the author endeavors to discover the exact point in the retina from which gliomatous tumors spring, and the relation between the elements of the retina and of the tumors. After rehearsing the views which have been held, he proceeds with the detail of the cases. He finds, it may be said in parenthesis, five cases of cure by operation—that is, the disease had not recurred within periods varying from one to six years.

Conclusions derived are that the elements of these tumors, when not

changed by preservative fluids, do not correspond to the normal elements of the retina, but to those of connective-tissue cellular new growths; that these new growths having the character of permanent new growths, the shape and arrangement of their elements correspond exactly to those of the round-celled, medullary sarcomata of other regions. The final conclusion is that, since these tumors correspond closely to the definition which Virchow gives of sarcomata, they ought properly to be classed among these, and may be distinguished by the special name of glio-sarcoma.

67.—*A Case of Retinal Glioma operated on at a very early Period, and showing some New and Peculiar Anatomical Conditions.* By Dr. H. KNAPP, New York. [Trans. of Am. Oph. Soc., 1870, pp. 84–86.]

The growth took origin at the anterior part of the retina, developing from the inner granular layer, and, as it increased, it detached the retina, and finally became enveloped or invaginated in it.

68.—*A Case of Supposed Glioma.* [Trans. Am. Oph. Soc., 1870.]

An infant, five months old, in whose eyes the father had noticed at birth a yellowish reflex, who at two months had an attack of inflammation, leaving a little opacity in one cornea—at the time of examination totally blind in both eyes. In both eyes there had been iritis; in one the pupil contracted; irides pushed forward; a yellow reflex in the interior of both eyes; in the one what appeared to be a tumor, with nodular surface, and some vessels. A number of good observers regarded the disease as glioma: and both eyes were extirpated.

The notes say nothing about the state of tension of the globes—a fact of some value.

On anatomical examination, no glioma found; simply the results of general internal inflammation; retina totally detached; behind it a thick reddish fluid, and a firm brownish mass, composed of shrivelled blood-globules and granular matter; choroid in place—much of its epithelium hypertrophied.

A case worth remembering, and a mistake of diagnosis which others have made (Graefe, in 1859, committed the same error, as we were witnesses). The harm done by operating was not serious, but it was an unpleasant thing certainly.

69.—*Rough Notes of a Case of Glio-sarcoma.* By B. J. JEFFRIES, M. D., Boston. [Trans. Am. Oph. Soc., 1870.]

The subject was a healthy man, aged twenty-seven. The tumor had come through the sclera, and infected the optic nerve, but did not occupy the interior of the globe. It was seated principally in the superior and internal recti muscles, while the ciliary body and choroid were infiltrated with the disease. The retina adherent, but not thickened. The microscopic elements were the rounded glioma-cells in the optic nerve and muscles, and, in the choroid, spindle-shaped cells.

70.—*The Diagnosis of Intra-ocular Sarcomata.* By Dr. OTTO BECKER, of Heidelberg. [Archives of Oph. and Otol., vol. i., part ii., pp. 694–715.]

In this highly-interesting paper seven cases are described. In three, a small tumor was detected at the region of the macula lutea, and in two the retina was not detached; in the other, vitreous opacities made it difficult to decide upon the position of the retina. In a fourth and fifth case, a tumor grew from the inner and outer side of the fundus; in a sixth, and in a seventh also, from the outer side. In the fourth, fifth, and sixth, the retina was in contact with the surface of the tumor, but, near its base,

was a little detached; but the tumor had a pedunculated, gourd-like shape, and this alone Dr. Becker deems sufficient to fix the diagnosis of choroidal sarcoma as against sub-retinal effusion. The diagnosis between these two conditions is or is not to be made out, Dr. Becker thinks, according to the situation of the choroidal sarcoma. If it originate from the ciliary body, Dr. Knapp showed that it does not or may not cause any sub-retinal effusion. If at the region of the macula lutea, they show less disposition to grow into the interior of the eye, as the first three cases demonstrated, but pushed through the sclera, and developed largely in the orbit.

When the tumor within the eye is larger, its appearance varies according to its situation on the upper, lower, or lateral parts of the globe. In these cases the retina is usually to some degree detached. If the tumor be below, the retina will lie in contact with its summit, and spread out on all sides in a broad detachment. As the tumor grows and adheres to the retina, if vessels are perceived in the neoplasm, it may be diagnosticated, but otherwise it will be likely to escape notice. If the tumor be growing from above, the detached retina will hang down like a pouch, and no detachment be visible at the base. If the growth spring from the lateral wall, the retina never fails to become somewhat detached about its base. Sometimes the outline of the tumor can be traced through the detached retina; this depends on the depth of the superjacent fluid.

Another point deserving special mention is, that as a sarcoma grows it exhibits a vascular net-work on its surface, and these vessels grow rapidly. They may at first be faint, and afterward strongly marked. Two well-executed chromos illustrate one of the cases.

For the examination of the tumors which reach forward to the middle of the eye, Dr. Becker suggests that the highest magnifying power is gained by holding a strong convex lens close to the eye, and the mirror as near to and behind it as may be consistent with proper illumination.

71.—*An Atrophied Globe which contained a Choroidal Sarcoma partly softened and partly ossified.* By Dr. H. Berthold. [Klinische Monatsblät. für Augen., January, 1870, s. 19–24.]

MISCELLANEOUS.

72.—*Investigations into the Lymphatics of the Eye, and their Distribution.* By Dr. G. Schwalbe. [Archiv f. Mikroskop. Anat., Bd. vi., pp. 1–61; also Bd. vi., pp. 261–362. Monatsblät. f. Augen., April, 1870, 117, July, August, 1870, 227.]

This investigation has been conducted with the utmost labor and completeness. The lymphatic circulation of the eye is divisible into an anterior and posterior region. To the latter belong the perivascular spaces of the retina, the perichoroidal space with its outlets, and the space between the outer and inner optic nerve-sheath, which does not communicate with the other two systems, but directly with the arachnoid cavity. The tissue between the choroid and sclera, which was formerly called lamina fusca, and afterward considered unworthy of designation as a special membrane, again assumes its former dignity as a serous *sac*, and is called by Schwalbe the supra-choroidea. In it he finds an endothelium. It consists of elastic fibres, flat cells, and nuclei. It appears only in eyes of adults, and in later years, under the influence, it is believed, of the accommodation. The space within this membrane reaches forwards to the ciliary processes and back to the nerve-sheath. It does not connect with the lymph-vessels in the stroma of the choroid. Neither has it any communication with the anterior chamber. But it does communicate with the surface of the globe, that is, with the space beneath the capsule of Tenon, at the four orifices by which

the venæ vorticosæ emerge from the bulb. The outlet of the supra-choroidal lymph-space is therefore a perivascular one.

Within the capsule of Tenon, too, there is a lymph-space where the characteristic endothelium may easily be recognized. After hardening by Müller's fluid, a delicate membrane with elliptical nuclei may be taken from the exterior of the sclera, and it is entirely similar to the supra-choroidal endothelium. An attempt to push an injection from the cavity of the capsule in other directions did not succeed, but, by beginning in the cavity of the arachnoid, not only was the cavity of the capsule of Tenon injected, but also the lymphatic vessels and glands of the neck, by which complete proof was afforded that the perichoroidal and Tenonian cavities are true lymph-spaces.

It is also shown that the space between the two sheaths of the optic nerve is a lymph-cavity, and opens directly into the arachnoid, while it also communicates with the lymphatics of the neck. It has an endothelium. This space does not connect with the cavity of the capsule of Tenon, which is supra-vaginal, nor with the perichoroidal cavity, although the injection comes very close to it, at the entrance of the nerve into the eye.

In a second part of the above paper, the lymphatic circulation of the anterior part of the eye is considered. It is impossible to condense the hundred pages of this description into the limited space we can occupy, and do justice to the laborious investigations of the author.

First, is studied the anterior chamber and its outlets; second, the canal of Petit, and the ciliary zonula. By injection of Berlin blue into the anterior chamber under a pressure of thirty to fifty mm. of mercury, soon a blue ring appears in the vicinity of the border of the cornea and the surface of the sclera, from which anastomosing vessels run in various directions. By careful study it was shown that the vessels thus injected were not perivascular lymphatics, but veins, which are in open communication with the anterior chamber.

The relations and surroundings of the canal of Fontana, the pillars of the iris (ligamentum pectinatum), and the canal of Schlemm, are then taken up, with the view of more particularly learning how fluid injected into the anterior chamber finds its way into the veins. He finds the ligamentum pectinatum, the canal of Fontana, which lies more peripherally, and the canal of Schlemm, to be distinct structures, although in close contiguity. The inner wall of the canal of Schlemm is made by a prolongation of the membrane of Descemet, and from the inner surface of this wall, which is freely fenestrated, spring the septa and fibres which compose the net-work of the canal of Fontana. The openings in the walls of these canals have their long axes parallel to the equator of the eye. The outer wall of the canal of Schlemm is made by the sclera, and from its posterior angle the ciliary muscle originates. The author does not agree with Leber, that it is only a venous sinus, or part of the ciliary plexus—he states that the ciliary plexus of Leber is a wholly different thing. The canal has an endothelium of a peculiar reticulated appearance. From the above it is plain how fluid may pass from the anterior chamber into the canal of Schlemm, and may reach the blood-vessels, because numerous veins open directly in the canal. Under ordinary circumstances the canal is a lymph-vessel, but by an excess of pressure in the blood-vessels it may be filled with blood. It is not part of the ciliary plexus, but connects with it by a few venous twigs; and these twigs may, under different circumstances, carry blood or lymph. If the tension in the anterior chamber be diminished by paracentesis, an injection into the arteries easily passes into the anterior chamber, but, with the usual equilibrium, this cannot occur.

The canal of Petit is also capable of being filled by injection from the anterior chamber. To account for this, there were found five fissural

openings in the anterior wall, close to the border of the lens, and *vice versa*, by these, the anterior chamber may be filled from the canal. But the canal cannot be injected from the vitreous chamber, which shows that the posterior wall is entire.

It is thus shown that the anterior chamber, the posterior chamber, and the canal of Petit, constitute a continuous lymph-space. Most of this fluid comes from the vessels of the iris and ciliary body, through the reticulations of the canal of Fontana into the anterior chamber. The outlets of the latter are the ciliary veins, through the canal of Schlemm. Pressure in the part of the eye behind the lens causes a partial escape of the aqueous humor through the veins. This was proven by direct experiment with colored fluid injection. The slow increase of pressure which takes place in glaucoma is well known to have this effect, and how the shallowness of the anterior chamber occurs may thus be understood.

We are tempted to conclude our *résumé* by a quotation of the concluding pages which relate to the changes that take place in accommodation, but any thing less than complete rendering would be unsatisfactory, while our space is already occupied.

73.—*Statistics of Operations in Dr. Wecker's Clinique, Paris, for* 1869. [Schmidt's Jahrbuch, No. 5, 1870, s. 190.]

Cataract extractions by peripheral linear section..... 109.

Of these—

69	read	Snellen	No. 1 — vision	= $\frac{1}{2}$ to 1.
10	"	"	No. 1 — "	= $\frac{2}{5}$.
7	"	"	Nos. 3 and 4.	
2	"	"	No. 5.	
16	could count fingers at 20 feet.			
5	were failures.			

Prolapse of vitreous at the operation happened ..	6 times.
Discissions.....	2 "
Iridectomy—for artificial pupil.....	13 "
" as therapeutic operation.....	117 "
Strabismus operations.....	90 "
Puncture of detached retina.....	12 "
Enucleation.....	5 "

In only one of the six patients on whom the puncture of detached retina was performed did useful results follow. In three cases Wecker performed an operation first suggested by himself—the tattooing of leucoma of the cornea, to conceal or remove the unsightliness of its appearance—and with satisfactory result.

74.—*Description of a New Exophthalmometer.* By Dr. Emil Emmert.

Another New Exophthalmometer. By Dr. W. Zehender. [Klinische Monatsblät. für Augen., February, 1870.]

Of the two instruments above described for measuring the degree of prominence of the globe, that of Dr. Zehender appears to be the more simple, and to be both accurate and easily available. We must refer to the articles for adequate description.

75.—*A New Iris-Forceps.* By Dr. Liebreich. [Monatsblät. für Augen., June, 1870, p. 183.]

Our report has become so lengthy that we may not venture to present any thing of the last number of the Archives for Ophthalmology (Bd. xvi., Abth. i.)

But we cannot forbear alluding to the sad announcement which, with emblems of mourning, its first page makes of the death of Prof. Graefe, on the night of July 20, 1870. The scientific world suffered a heavy loss—to ophthalmic science there could be no loss so heavy. So genial was his temper and so brilliant his gifts, so unwearied and energetic his labors, that both young and old accorded him the highest place in ophthalmic surgery. The debt which humanity owes to him, in what he did personally and through those whom he taught and stimulated both by word and pen, will never be fully estimated. The editors of the Archives, Profs. Arlt and Donders, announce their purpose to continue the journal, and close their tribute to his memory with the words—

"*Amicissime, requiescas in pace.*"

BOOKS AND PAMPHLETS.

Pathologie Iconographique du fond de l'Œil—traité d'Ophthalmoscopie—par A. de Montmeja. Paris, 1870. The chromo-lithographs are crudely done.

Atlas d'Ophthalmoscopie et d'Optomètrie, par M. Maurice Perrin.

Traité pratique d'Ophthalmoscopie et d'Optomètrie, par M. Maurice Perrin. Paris, 1870.

A work of considerable merit. The plates are small, and not finished in the highest degree, but have real value.

Atlas d'Ophthalmoscopie, par R. Liebreich. 2me edition. Paris, 1870.

This second edition of a classical work has been modified in important respects by adding new plates, as well as substituting some in place of others. It is to be presented in an English dress by Messrs. Churchill, of London. It will be gladly received.

Ueber das Verhalten der Doppelbilder bei Augenmuskeln-lähmungen von Dr. M. Woinow. Wien, 1870.

This is a series of tables indicating the appearances of double images in all possible cases of paralysis of ocular muscles, and is eminently instructive.

Ein Wort zür Erinnerung an Albrecht von Graefe, von Prof. Alfred Graefe. Halle, 1870.

A eulogium on Prof. Graefe by his cousin.

Die Augendiätetik oder die Kunst des Schvermögen zu erhalten und zu verbessern von Dr. J. Ch. Jüngken. Berlin, 1870.

Die Ophthalmia militaris sive granulosa von modernen Standpunkte, von Dr. Max Peltzer. Berlin, 1870.

Traité des Opérations qui se pratiquent sur l'Œil, par E. Meyer et A. de Montmeja. Premier partie. Paris, 1870. Accompagné d'un Atlas photographique.

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