

the greatest difficulty in learning to read. While he was unusually bright at figures and an average speller, he could rarely read by sight more than two or three consecutive words, but came to a standstill every second or third word, and was unable to proceed unless he were allowed to spell the word aloud, thus appealing to his auditory memory, or so spell it silently with his lips, thus appealing to his memory of speech movements. His refraction, visual acuity, and fundus were normal.

This defect appears to be due to a difficulty in acquiring and storing up in the brain the visual memories of words and letters. It may not extend beyond this visual group of images. The visual memories of numbers and musical notes may be quite normal. These facts are to be explained by the different groups of visual images being stored up in different, but probably contiguous, areas, most likely the angular gyrus of the left side. As defect of the gyri on both sides is rare, re-education can be accomplished with great perseverance. The obstacle is probably due to the fact that all the centres involved in speech are on the same side of the brain.

Glaucoma and the Glaucoma Theories.—PATTERSON (*Scottish Medical and Surgical Journal*, July, 1904) gives an interesting exposition of the present views upon this subject. The source of the aqueous humor is to be found in the epithelium of the ciliary region. Leber describes the secretion of the aqueous as a transudation or filtration process depending upon a difference of pressure between the blood in the vessels and the fluids in the chambers of the eye. Doubtless, however, the epithelial cells play more than a passing or mechanical role. No direct nervous mechanism has been demonstrated. By acting indirectly through the vasomotor nerves, the balance between blood pressure and intraocular pressure, and, consequently the amount and character of the secretion may be greatly modified. Normal aqueous strongly resembles normal saline solution. After puncture of the anterior chamber it contains much albumin and fibrin and is spontaneously coagulable. The vitreous humor is really a tissue of the finest fibriles, containing in their meshes a fluid almost identical in composition with the aqueous. This fluid can pass through the zonula, but the interchange of fluid in the meshes of the vitreous is probably very slow.

Almost the only path for the elimination of fluid from the eye, at least in man, is the filtration angle. In addition, there is probably some absorption of fluid by the vessels of the iris and a slow passage from the vitreous by the optic nerve. Schlemm's canal is a venous rather than a lymph sinus. It often contains blood corpuscles. It communicates by the minutest pores with the anterior chamber; the anterior ciliary veins have direct communication with it, so that fluid from the anterior chamber passes directly into the veins of the sclerocorneal margin.

The fluid contents of the eyeball stand at a pressure midway between the arteriicapillary and venous blood pressures. It equals about 25 mm. Hg.; physiological variations from this standard are possible only in a very limited range. The tension is the same in the aqueous and vitreous chambers. This is not altered by accommodation. The intraocular tension can never exceed the blood pressure in the ciliary arteries, 90 to 110 mm. Hg. The blood pressure in the capillaries of the ciliary region has been estimated at about 50 mm. Hg.; that in the veinlets into which the fluid filters from the anterior chamber at about 10 to 15

mm. Hg. Mydriatics and myotics have no influence on the tension of the normal eye. Increase and diminution of the blood pressure have a corresponding effect respectively upon intraocular tension. Division of the sympathetic appears to cause some transient diminution of tension.

Glaucoma. Attempts at producing glaucoma in animals have usually succeeded but imperfectly. The most successful was Bentzen, in Leber's laboratory, who produced permanent increased tension by wounding the tissues at the filtration angle, which caused adhesions, shutting of the angle. In secondary glaucoma an evident mechanical obstruction can usually be demonstrated, giving rise to retention.—*e. g.*, fragments of lens matter in traumatic cataract, blocking the spaces of Fontana, etc.

In primary glaucoma these mechanical explanations no longer suffice. A great obstacle in the way of investigation is the difficulty of obtaining glaucomatous eyes for examination in the earlier stages of the disease, of which very few cases have been published. The later lesions are (1) cupping of the disk with accompanying optic atrophy, (2) closure of the filtration angle, (3) degenerative changes in the intraocular bloodvessels. Most of the glaucoma theories stand in close relation to 2 or 3. The older views of glaucoma associated with the names of von Graefe and Donders were based on the idea of hypersecretion. These views have been largely abandoned. A new conception of glaucoma was introduced by Knies. This regards the increased tension as caused by retention due to adhesions of the root of the iris to the cornea, blocking the filtration angle. Weber explained this by forward pressure of the swollen ciliary processes. While the angle is undoubtedly frequently blocked, most observers no longer regard this as a primary lesion, having been found absent in certain glaucomatous eyes examined in the early stage. Czermak and Birnbacher have laid special stress on the diseases of the vertex veins, endophlebitis, and periphlebitis, but this does not appear to be constant. Priestley Smith brought forward a theory which considers the circumlental space as becoming narrowed, especially in hypermetropic eyes, from the growth of the lens. There are many difficulties in the way of accepting this. Panas appears to favor a modified secretion theory due to changes in the nerves and bloodvessels. Abadie's idea that glaucoma is due to disease of the sympathetic has not found much favor.

The author, like most observers, favors a retention theory. One great point in its favor is the well-known fact that glaucomatous eyes remain hard for a long time after enucleation. There is practically no outflow from such eyes. The extreme shallowness of the anterior chamber in glaucoma has never been satisfactorily explained. Injection of fluid into the vitreous in animals' eyes causes very little shallowing of the anterior chamber. In eyes liable to acute glaucoma a very shallow anterior chamber is the rule. With the blocking of the filtration angle, there is probably an advance of the root of the iris and anterior part of the ciliary body, which further increase the shallowness of the anterior chamber.

In explaining the more chronic forms of glaucoma, the writer would lay most stress on changes in the vascular system, both general and local. Signs of vascular degeneration, both local and general, are most marked in the variety which occurs in association with retinal hemorrhage. Being characteristically a disease of advanced life, its relation to changes in the vascular system seems especially noteworthy. Zimmer-

man, in a recent paper, expresses the view that glaucoma depends on a reduction of arterial blood pressure leading to nutritive changes, transudation, etc.; but experiment and clinical evidence seem alike opposed to this opinion. In fact, the writer believes that such patients present an increased rather than a lower arterial pressure.

It does not seem worth while to study further the changes in glaucomatous eyes unless the examination be made in the earlier stages, perhaps such opportunities might be found in animals, as the disease is said to occur frequently in aged dogs kept under highly artificial conditions.

PATHOLOGY AND BACTERIOLOGY.

UNDER THE CHARGE OF

SIMON FLEXNER, M.D.,

DIRECTOR OF THE ROCKEFELLER INSTITUTE FOR MEDICAL RESEARCH, NEW YORK.

ASSISTED BY

WARFIELD T. LONGCOPE, M.D.,

RESIDENT PATHOLOGIST, PENNSYLVANIA HOSPITAL, PHILADELPHIA.

The Importance of *Bacillus Pneumoniae* Friedlaender as a Cause of Pneumonia.—STÜHLERN (*Centr. f. Bak. und Parasitknd.*, 1904, Bd. xxxvi., p. 493) records ten cases of pneumonia in which the bacillus pneumoniae Friedländer was recovered either from the consolidated lung at autopsy or from the sputum during life. In three instances this bacillus was found in the lung unassociated with other organisms. In five cases there was a mixed infection of bacillus pneumoniae and diplococcus lanceolatus, and twice these two organisms, together with staphylococcus pyogenes aureus, were cultivated from the sputum. At autopsy the lungs presented the picture of an atypical lobar or pseudo-lobar pneumonia, often hemorrhagic in character. The symptomatology and physical signs were those of an atypical lobar pneumonia, bloody, slimy sputum being common. The prognosis is very unfavorable and the mortality high.

Tuberculosis of the Mitral Valve and of the Aorta.—Tuberculosis of the heart valves may arise in one of three ways: by direct infection through a deposit of tubercle bacilli upon the endocardium, through hæmatogenous infection by way of the bloodvessels of the valves, and from secondary infection of vegetations or thrombi. WITTE (*Ziegler's Beiträge*, 1904, Bd. xxxvi., p. 192), from a review of the literature, concludes that true tuberculous endocarditis is of extremely rare occurrence, and, eliminating many doubtful cases reported, he would include in the above group only the cases reported by Benda, Burkhardt, and possibly the one recorded by Tripier. The author describes a tuberculous infection of the mitral valve following a right tuberculous coxitis and accompanied by generalized tuberculosis. There was no chronic valvular disease, no vegetation, and no mixed