The establishment of a baseline for measuring effectiveness of suppressive drugs represents an important step in the development of agents to assure successful corneal transplant surgery.

Retinal Disorders

Although the cornea, lens, and other issues help convey light through the eye, the actual visual process does not begin until light strikes the retina. This light-sensitive tissue at the back of the globe of the eye is the site of many disturbances which lead to visual impairment. Disorders of the retina include circulatory disturbances, injuries, inflammations, degenerations, detachments, tumors, and congenital anomalies.

Many of these disorders, especially degenerations and anomalies existing at birth, are untreatable by present-day medicine. Therefore, investigators are seeking to understand the basic anatomy and function of the retina, which they feel is necessary before treatment or prevention is possible.

Accurate understanding of retinal topography was increased this year through NINDB studies which systematically evaluated the nature of the retina in a series of eyes obtained through surgical removal and autopsy. This analysis revealed the general size and shape of the retina, the dimensions of the optic disk, and the relationship between the disk and the foveola. Through such topographical studies we shall have a better understanding of the physical and physiological characteristics of the eye.

Retinal Detachment.—Retinal detachment is a separation of the innermost layer of the eye, the retina, from the choroid, the layer just behind it. These two layers are usually in close contact; but if the retina should peel away or be pushed up from the choroid, all or part of the vision is blocked out.

Retinal detachment may be due to injury or disease. Changes that occur with age increase the chances for detachment. Persons who are nearsighted or who have had cataract operations may also be predisposed to detachment. Most detachments, however, occur for reasons unknown to medical science.

If treated early, retinal detachment may be arrested by procedures which produce an adherent scar at the point of separation. There have been important advances in the way in which this is accomplished. The retina may be burned by a sharply focused laser beam. More recently, freezing techniques (cryosurgery) are proving highly effective.

Recent advances reported in the use of retinal light coagulation indicate that certain lesions, particularly in cases of diabetic retinopathy, small fundus tumors, and lesions that lead to retinal detachment, may respond in selected cases to light coagulation. In this method, light makes a "spot weld" which, when properly directed, can be used to close off blood vessels, seal a retinal hole, anchor the retina to underlying tissue by scar formation, or necrotize ("kill") small tumors. Certain medical lesions of the fundus may be treated by light coagulation alone; in others, it is necessary to supplement the coagulation effect with heat applied to the posterior scleral surface after surgical exposure. Success with this method depends upon careful selection of patients; all cannot profit from it.

Understanding of retinal detachments was advanced by the evidence that there may be hereditary causes. There is indication of a relationship between myopia and retinal detachment. This was substantiated by a statistical analysis of 1,000 cases.

Diabetic Retinopathy.—Diabetic retinopathy is a vascular disorder of the eye which occurs in conjunction with diabetes. The condition is caused by baloon-like enlargements (aneurysms) of the capillaries supplying blood to the retina. No effective treatment is currently available. The incidence of this disorder increases with the length of time an individual has had diabetes. For example, in a series of patients who had diabetes for 15 years, 70 percent showed retinopathy, and of those who had diabetes for 25 years, 90 to 95 percent had diabetic retinopathy.

Morbidity statistics indicate that in 1934 the incidence of diabetic retinopathy among diabetics was 17.7 percent; in 1945 it was 29.6 percent; and in 1955 it was 47 percent! Diabetic eye complications are among the leading causes of blindness in the United States.

A few short years ago there was no specific treatment for diabetic retinopathy, but recently a few physicians have had success with removal of the pituitary gland in patients threatened with blindness. Preliminary results have shown improvement in visual acuity with no known harmful effects from the surgery. Nevertheless, further observations are needed before the procedure can be widely recommended.