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# GIFFORD'S TEXTBOOK OF OPHTHALMOLOGY

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By

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FOURTH EDITION, ILLUSTRATED

W. B. SAUNDERS COMPANY

*Philadelphia and London*

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Reprinted May, 1948, July, 1950, and November, 1951

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PHILADELPHIA

## PREFACE TO THE FOURTH EDITION

THIS revision of Dr. Sanford Gifford's text has been made to carry out the original purpose of the book. He was impressed with the need of a Text on Ophthalmology which would be of value to the medical student and to the physician not specializing in ophthalmology. He realized that the usual texts gave too much specialized knowledge which would never be used by the general physician, and too little to enable him to treat adequately those patients who regularly come to him before seeing a specialist.

Changing trends in medical education have made it imperative to reevaluate what the medical student should be taught. He should not be asked to study the details and the technics of a specialty for which he will have no use in his later work. The problem of the undergraduate teacher, therefore, is to select that material which will be of practical use to the student after his graduation. All medical educators are agreed that several years of post-graduate study are essential for any physician who intends to practice a specialty.

Ophthalmology is a valuable subject for every physician, no matter in what field he is engaged, and more than any other specialty, with the possible exceptions of pediatrics and psychiatry, will be of use to him in all branches of medicine. No excuse is needed for presenting a well-organized course in ophthalmology in the medical curriculum, provided the material is carefully selected with the students' future needs in view.

An endeavor has been made in this edition to present only that part of the subject which every physician will find of value. The material has necessarily been developed beyond the immediate needs of the medical student, but should be useful as a working basis for a course in the medical school and as a reference book for the later years of practice.

The technics of refraction and operations have been condensed considerably for reasons previously given. An orientation in various surgical procedures is given in a separate chapter, which can be referred to when needed without interrupting the subject under discussion. Special emphasis has been laid upon the relation of the eye to general medical and neurological conditions. An effort has been made to acquaint the physician and medical student with those diseases of the eye which he may safely treat himself; with the details

of the treatment; and the indications, in others, which should prompt him to direct the patient to seek more expert advice.

References are given to articles in current literature in English, which will serve as a guide to further reading and amplification of knowledge. No attempt has been made to make these references complete, and only those were selected which the author felt would serve as a general review of the subject.

FRANCIS H. ADLER

# CONTENTS

## Chapter 1

PAGE

EXTERNAL EXAMINATION OF EYES AND ADNEXA. . . . .	1
Eyelids and Palpebral Fissures. . . . .	1
Lashes and Eyebrows. . . . .	2
Position of the Eyeballs. . . . .	2
Motility of the Eyeballs. . . . .	3
Lacrimal Apparatus . . . . .	4
Conjunctiva. . . . .	4
The Cornea. . . . .	7
Iris and Pupil. . . . .	9
Intra-ocular Pressure. . . . .	9
Examination of Infant and Small Child. . . . .	10

## Chapter 2

EXAMINATION OF THE EYE BY OPHTHALMOSCOPY . . . . .	11
The Ophthalmoscope. . . . .	11
Examination of the Ocular Media . . . . .	12
Examination of the Fundus. . . . .	14
Normal Fundus . . . . .	15
Normal Variations. . . . .	18

## Chapter 3

EXAMINATION OF THE EYE BY OTHER OBJECTIVE METHODS. . . . .	19
Slit Lamp Microscopy . . . . .	19
Cornea . . . . .	21
Anterior Chamber . . . . .	23
Iris. . . . .	24
Lens . . . . .	24
Vitreous . . . . .	25
Transillumination . . . . .	25
Measurement of Intra-ocular Pressure . . . . .	26
Testing Corneal Sensitivity . . . . .	28
Examination of Pupil. . . . .	28

## Chapter 4

FUNCTIONAL EXAMINATION OF THE EYE . . . . .	30
Determination of Visual Acuity . . . . .	31
Testing Accommodation or Focusing Power. . . . .	35
Investigation of Visual Fields . . . . .	35
Methods of Testing Visual Field. . . . .	37
Distribution of Nerve Fibers . . . . .	40
Types of Pathologic Field Defects . . . . .	46
Tests for Color Sense. . . . .	53

	PAGE
Dark Adaptation . . . . .	53
Psychosomatic Disturbances of Visual Function . . . . .	54
Emotional Disturbances . . . . .	54
Malingering . . . . .	55
References . . . . .	55

### Chapter 5

DISTURBANCES OF OCULAR MOTILITY. . . . .	57
Anatomy and Physiology of the Individual Muscles . . . . .	58
Movements of the Globe . . . . .	60
Action of the Individual Muscles. . . . .	61
Voluntary Control of the Ocular Movements . . . . .	64
Reflex Control of the Ocular Movements . . . . .	69
Static Reflexes. . . . .	72
Static-Kinetic Reflexes . . . . .	72
Nystagmus . . . . .	73
Proprioceptive Sense of the Ocular Muscles . . . . .	75
Visual Fixation Reflex . . . . .	75
Fusion . . . . .	80
Orthophoria and Heterophoria . . . . .	84
Strabismus or Squint. . . . .	89
Concomitant Strabismus . . . . .	89
Types . . . . .	90
Paralytic Strabismus. . . . .	93
Supranuclear Paralysis. . . . .	94
Paralysis of Individual Ocular Muscles . . . . .	98
Paralysis of the Third Nerve: The Ophthalmoplegias. . . . .	103
References . . . . .	107

### Chapter 6

OPTICAL DEFECTS OF THE EYE . . . . .	109
Physiologic Optics . . . . .	109
Refraction by the Eye . . . . .	112
Accommodation . . . . .	113
Presbyopia . . . . .	115
Ametropia . . . . .	116
Hyperopia . . . . .	117
Myopia. . . . .	119
Astigmatism. . . . .	123
Methods of Refraction . . . . .	124
Prescription of Glasses . . . . .	124
References . . . . .	126

### Chapter 7

THE ORBIT . . . . .	127
Anatomy . . . . .	127
Congenital Malformations. . . . .	130
Circulatory Disturbances . . . . .	131
Orbital Inflammation. . . . .	134

	PAGE
Exophthalmos. . . . .	135
Exophthalmos of Graves' Disease . . . . .	138
Orbital Tumors . . . . .	147
Primary Tumors in the Orbit . . . . .	147
Tumors from Adjacent Structures . . . . .	149
Metastatic Tumors. . . . .	149
Pseudotumors; Chronic Orbital Myositis . . . . .	149
Enophthalmos. . . . .	150
Orbital Injuries . . . . .	150
References . . . . .	151

Chapter 8

THE EYELIDS . . . . .	152
Anatomy . . . . .	152
Alterations in the Form of the Lids. . . . .	156
Alterations in the Size and Form of the Fissures. . . . .	158
Changes in Position of the Lids . . . . .	158
Entropion. . . . .	158
Ectropion. . . . .	161
Diseases of the Skin of the Lids . . . . .	162
Alterations in the Circulation of Blood and Lymph. . . . .	162
Emphysema of the Lids. . . . .	165
Inflammatory Diseases of the Skin. . . . .	165
Hypertrophic, Abiotrophic and Degenerative Processes . . . . .	170
Changes in Pigmentation of the Lids. . . . .	171
Diseases of the Glands of the Lids . . . . .	172
Diseases of the Sebaceous Glands . . . . .	172
Diseases of the Sweat Glands . . . . .	173
Diseases of the Lid Margin . . . . .	173
Marginal Blepharitis. . . . .	173
Hordeolum . . . . .	175
Diseases of the Cilia . . . . .	176
Diseases of the Tarsus and Its Glands. . . . .	177
Alterations in Movements of the Lids. . . . .	179
Tumors of the Lid. . . . .	183
Congenital Tumors. . . . .	183
Acquired Tumors . . . . .	184
Injuries of the Eyelids . . . . .	186
Ecchymosis . . . . .	186
Wounds of the Eyelids . . . . .	186
Burns . . . . .	188
References . . . . .	189

Chapter 9

THE LACRIMAL APPARATUS . . . . .	190
Anatomy . . . . .	190
Diseases of the Lacrimal Gland . . . . .	191
Inflammation . . . . .	191
Tumors. . . . .	193
Diseases of the Lacrimal Ducts . . . . .	193
References . . . . .	195



*Chapter 10*

	PAGE
THE CONJUNCTIVA. . . . .	196
Anatomy . . . . .	196
Anomalies of the Circulation . . . . .	198
Conjunctivitis. . . . .	200
Bacteriology of the Conjunctiva. . . . .	202
Clinical Appearance of Certain Types of Acute Conjunctivitis. . . . .	204
Gonococcal Conjunctivitis. . . . .	204
Acute Catarrhal Conjunctivitis . . . . .	208
Trachoma. . . . .	210
Angular Conjunctivitis . . . . .	214
Conjunctival Glandular Form of Tularemia . . . . .	214
Allergic Forms of Conjunctivitis. . . . .	214
New Growths of the Conjunctiva . . . . .	216
Injuries of the Conjunctiva: Traumatic Conjunctivitis . . . . .	217
References . . . . .	219

*Chapter 11*

THE CORNEA . . . . .	220
Anatomy and Physiology . . . . .	220
Congenital Anomalies. . . . .	222
General Pathologic Considerations of Corneal Diseases . . . . .	223
Foreign Bodies on the Cornea . . . . .	223
Wounds of the Cornea . . . . .	225
Vascularization of the Cornea . . . . .	226
Edema of the Cornea. . . . .	227
Birth Injuries . . . . .	227
Inflammation of the Cornea: Keratitis . . . . .	228
Superficial Keratitis . . . . .	229
Deep Keratitis. . . . .	243
Degenerative Processes of the Cornea. . . . .	247
References . . . . .	250

*Chapter 12*

THE SCLERA. . . . .	251
Anatomy . . . . .	251
Pigmentation . . . . .	251
Ectasia and Staphyloma . . . . .	252
Inflammation: Scleritis and Episcleritis. . . . .	252
References . . . . .	253

*Chapter 13*

IRIS, CILIARY BODY, PUPIL. . . . .	254
Anatomy of the Iris and Ciliary Body . . . . .	254
Inflammation of the Iris and Ciliary Body . . . . .	256
Diagnosis of Specific Types of Iridocyclitis . . . . .	262
Tumors of the Iris . . . . .	267
Sympathetic Ophthalmia . . . . .	267

	PAGE
The Pupil . . . . .	269
Anatomy and Physiology of the Muscles . . . . .	270
Examination of the Pupil . . . . .	272
Disturbances in Pupillary Reaction . . . . .	275
References . . . . .	280

### Chapter 14

THE CHOROID AND VITREOUS BODY . . . . .	281
Anatomy . . . . .	281
Congenital Anomalies of the Choroid . . . . .	284
Inflammation of the Choroid . . . . .	285
Acute Choroiditis . . . . .	286
Special Types of Choroiditis . . . . .	287
Treatment of Choroiditis . . . . .	290
Tumors of the Choroid . . . . .	291
References . . . . .	292

### Chapter 15

THE CRYSTALLINE LENS . . . . .	294
Embryology . . . . .	294
Anatomy . . . . .	297
Cataract . . . . .	300
Causes of Opacification of Lens Fibers . . . . .	302
Theories of Cataract Formation in Man . . . . .	304
Symptoms of Cataract . . . . .	306
Types of Cataract . . . . .	306
Differential Diagnosis . . . . .	318
Treatment . . . . .	319
Dislocation of the Lens . . . . .	320
Arachnodactylia (Marfan's Syndrome) . . . . .	322
References . . . . .	322

### Chapter 16

GLAUCOMA . . . . .	323
Normal Intra-ocular Pressure . . . . .	323
Various Types of Glaucoma . . . . .	323
References . . . . .	330

### Chapter 17

THE RETINA . . . . .	332
Anatomy and Physiology . . . . .	332
Circulatory Disturbances in the Retina . . . . .	335
Obstruction of the Retinal Vessels . . . . .	338
Obstruction of the Arterial Circulation . . . . .	338
Obstruction of the Central Retinal Vein . . . . .	340
Arteriosclerosis . . . . .	342

	PAGE
General Characteristics of Sclerosis . . . . .	342
Types of Sclerosis . . . . .	345
Hypertension . . . . .	348
The Hypertensive Retinopathies . . . . .	348
Types of Hypertensive Retinopathy . . . . .	350
Arteriosclerotic Retinopathy . . . . .	351
Renal Retinopathy . . . . .	351
Hypertensive Retinopathy (Benign and Malignant) . . . . .	354
Late Toxemia of Pregnancy . . . . .	355
Diabetic Retinopathy . . . . .	356
Evaluation of Hypertensive Disease by the Ophthalmoscopic Picture . . . . .	359
Treatment of the Hypertensive Retinopathies . . . . .	360
Retinal Changes in Diseases of the Blood . . . . .	360
Atrophy and Degeneration of the Retina . . . . .	362
Detachment of the Retina . . . . .	370
Tumors of the Retina: Retinoblastoma . . . . .	374
References . . . . .	377

### Chapter 18

THE OPTIC NERVE . . . . .	379
Anatomy and Physiology . . . . .	379
Inflammatory Changes: Optic Neuritis . . . . .	385
Clinical Features . . . . .	385
Etiology of Optic Neuritis . . . . .	388
Papilledema or Choked Disc . . . . .	393
Optic Atrophy . . . . .	399
Tumors of the Optic Nerve and Sheaths . . . . .	402
Toxic Amblyopias . . . . .	402
References . . . . .	405

### Chapter 19

OCULAR DISORDERS DUE TO DISEASES OF THE CENTRAL NERVOUS SYSTEM . . . . .	406
Diseases of the Meninges . . . . .	406
Diseases of the Brain . . . . .	413
Disorders of the Cerebral Circulation . . . . .	413
Arterial Blood Supply . . . . .	413
Venous Circulation . . . . .	421
Cerebrospinal Fluid . . . . .	421
Inflammatory Diseases of the Brain . . . . .	422
Brain Abscess . . . . .	422
Viral Infections . . . . .	423
Demyelinating Diseases . . . . .	424
Congenital and Degenerative Disorders . . . . .	425
Cerebromacular Degeneration . . . . .	425
The Phakomatoses . . . . .	425
Hepatolenticular Degeneration . . . . .	427
Brain Tumors . . . . .	427
Focal Symptoms . . . . .	428
Eye Manifestations of Head Injuries . . . . .	436
References . . . . .	438

Chapter 20

	PAGE
OCULAR MANIFESTATIONS OF GENERAL DISEASES . . . . .	440
Infectious Diseases. . . . .	440
The Bacillary Diseases . . . . .	440
The Coccoal Diseases . . . . .	446
Contagious Diseases of Childhood . . . . .	447
Diseases of Doubtful Etiology. . . . .	450
Fungus Infections . . . . .	451
Diseases of Metabolism. . . . .	452
Diseases of the Urinary Tract . . . . .	454
Protozoan and Metazoan Diseases . . . . .	454
Viral Diseases. . . . .	457
Rickettsial Diseases . . . . .	458
Spirochetal Diseases . . . . .	459
The Arthritides . . . . .	462
Diseases of the Heart and Blood Vessels . . . . .	463
Diseases of the Blood. . . . .	465
References . . . . .	467

Chapter 21

ORIENTATION ON SURGICAL OPERATIONS ON THE EYE AND ADNEXA . . . . .	470
Extraction of Cataracts. . . . .	470
Glaucoma. . . . .	471
Operations on the Conjunctiva. . . . .	473
Operations on the Lids and Socket. . . . .	478
Operations for Removal of the Globe. . . . .	480
Operations on the Muscles of the Eye . . . . .	486
Operations on the Tear Apparatus. . . . .	487
Operation for Detachment of the Retina . . . . .	487

Chapter 22

THERAPEUTIC AGENTS USED IN OPHTHALMOLOGY . . . . .	489
Collyria or Eye Washes. . . . .	489
Local Anesthetics . . . . .	490
Mydriatics and Cycloplegics. . . . .	490
Miotics. . . . .	491
Ointments. . . . .	491
References . . . . .	491
INDEX . . . . .	493

## *Chapter 1*

# EXTERNAL EXAMINATION OF EYES AND ADNEXA

EVERY physician should be able to carry out a routine external examination of the eyes without the use of any special apparatus, and derive information of value for the diagnosis and treatment of his patients. To the discerning doctor, the patient's general expression, in no small manner determined by the eyes and their adnexa, indicates his general state of health and happiness, and occasionally something abnormal in the lids or the anterior segment of the eyeballs may be the clue to some particular disease. Thus, one is frequently led to a diagnosis by such findings as the exophthalmos of Graves' disease, ptosis of myasthenia gravis, nystagmus in multiple sclerosis and encephalitis, the Argyll Robertson pupil in tabes, and so on.

If a certain routine is followed in examining every patient, one will avoid overlooking signs of disease or injury which might otherwise escape notice. It is obvious that one must first learn what is normal in order to detect abnormalities, but this can soon be acquired if a routine is strictly adhered to in examining every case. Although at first such a comprehensive examination must consume time, this will rapidly be cut down as the experienced eye learns to take in at a glance what at first required careful scrutiny. Such a routine examination is outlined in this chapter.

## EYELIDS AND PALPEBRAL FISSURES

In a good diffuse light, preferably daylight, one should note the general appearance of the eyelids—their color, texture, swelling, position and motility (Fig. 1). Localized tumefactions may be either seen or felt by palpation. Any signs of inflammation or the presence of non-inflammatory edema should be noted. The texture of the skin should be observed; whether this is unusually thin or redundant, or thickened and scaly, or covered with desquamated epithelium. The presence of vesicles should likewise be detected.

The size and position of the palpebral fissures should be observed; whether they are equal and whether they show any abnormal change in size on movement of the eyeballs. Finally, the character of the involuntary blinking, whether abnormally frequent or absent, should be determined and the extent of the voluntary lid closure and opening.

Can the patient close both eyes tight on command and do both lids move upward equally well when the patient is requested to look upward? Are the lid borders in close apposition to the globes, or is a portion of either eyelid everted, so that the conjunctival surface is exposed? Is the lid border inverted so that the lashes are turned in



Fig. 1. Normal eyelids and adnexa. Note position of upper lid at edge of pupil, lower lid just below limbus. Also note highlight just off center of pupil.

against the cornea? Is the amount of skin between the two fissures and covering the bridge of the nose normal in amount and texture, or is it excessive?

### LASHES AND EYEBROWS

The number, size and color of the hairs forming the brows and lashes should be observed and the direction of the eyelashes noted particularly—i.e., whether they are turned in or out, or misdirected in any direction. There may be a patchy loss of lashes, or some new-formed or stunted lashes, or even a localized patch of abnormally colored lashes, for example white. Careful scrutiny of the lash border should be made, noting any scales due to secretion or even animal parasites.

### POSITION OF THE EYEBALLS

There is a very wide range in the prominence of the eyeballs in normal individuals and caution should be observed in deciding that both eyes are either abnormally prominent or sunken in the orbital cavity. A displacement of more than 1.5 mm. of one eye in front of the fellow eye is definitely abnormal, but this can only be determined by instrumental measurement. Unless the difference is so marked that there is no question about it, it is safer not to rely on naked eye observation for the diagnosis of exophthalmos or enophthalmos. Many times an eye appears to be prominent in the orbit because the palpebral fissure is wider on that side than on the opposite. This frequently gives

rise to a false diagnosis of exophthalmos, or at least to a false impression of the degree of exophthalmos. This will be discussed in greater detail in the section on exophthalmic goiter (page 138).

When the patient is looking straight ahead of him towards the horizon, the two eyes should be on the same level and the visual axes apparently parallel. In a general way, this can be determined by observing the location of the reflection of a window or a light on the cornea of each eye, noting particularly where it lies in respect to the edge of the pupil (see Fig. 1). If the reflex lies in the same position in each eye, one can be reasonably sure that the eyeballs are in straight alignment. A still more accurate method of determining this is to have the patient fix a distant object and then to place a cover over the right eye while observing the left carefully to note any slight movement of this eye. If the left eye shows not the slightest movement when the right is covered, one can be certain that this eye is in proper alignment. The cover is then removed from the right eye and at least a second or two allowed to elapse while the patient is again told to keep looking at the same distant object. The cover is now placed over the left eye, while the examiner watches the right eye for any movement. If this eye also fails to show any movement when the left eye is covered, it can be said that this eye also is in proper alignment. This test is more accurate than judging the position of the eye by the corneal reflexes, because the cornea is not a perfect sphere but an ellipsoid with its major axis frequently not corresponding with the visual line. Hence, the reflex may lie inside or outside the center of the pupil when the patient is looking straight ahead in the distance, even though the eyes are in good alignment. This will give rise to the impression that the eyes are either divergent or convergent.

#### MOTILITY OF THE EYEBALLS

The extent to which each globe can be turned in the cardinal directions should be determined, and care taken to note whether the two eyes move together. Normally, the eyes are in alignment on looking straight ahead and slightly below the horizon. They can be moved throughout a wide angular range in all directions. No involuntary movement of the eyes should occur under these conditions, except in the extremes of gaze, when a nystagmus (see p. 73) may be found (end-position nystagmus). Special attention should be paid not to overlook a fine nystagmus. Occasionally, fine rotational nystagmus will escape observation until the fundus is examined with the ophthalmoscope.

The convergence near-point should be determined; this is the point closest to the patient up to which both eyes can converge on an object brought up towards him. As soon as one eye begins to deviate outward, the limit of the convergence has been reached. This is the convergence near-point.

## LACRIMAL APPARATUS

The surface of the cornea and the conjunctiva is kept moist by the tears and the secretion of the glands lining the lids. It should be noted whether there is any lack of this fluid, or whether the tears are present in excess. The latter may be due either to excessive formation of tears or to some obstruction in the passages which normally drain them away from the eye. The position of the lacrimal puncta and their size should be observed and pressure over the lacrimal sac made to determine whether this contains any secretion or pus. The presence of any fluid in the sac on pressure is an indication that the tear duct is blocked. The character of the fluid will then indicate whether the sac is infected or not.

## CONJUNCTIVA

**Bulbar Conjunctiva.** The bulbar conjunctiva is now examined while the lids are held gently apart and before any manipulation is carried out which might produce congestion of the conjunctival vessels. A few vessels are usually visible on the normal conjunctiva and not uncommonly these are large, tortuous episcleral vessels. In some people, their presence is annoying, since they make the eyes look abnormally congested. One should become familiar with the common normal variations to avoid the mistake of calling such vessels pathologic. Except for these larger vessels and occasional depositions of pigment, the sclera should be a porcelain white color as seen through the bulbar conjunctiva (see p. 251). Pathologic congestion of the bulbar conjunctiva should be recognized at once. Two forms of pathologic congestion occur.

*Superficial Congestion (Fig. 2).* This occurs when any irritation of the conjunctiva is present, such as a foreign body on the eyelid or a bacterial or traumatic conjunctivitis. Only the superficial layer of vessels is involved. These vessels are tortuous, have a bright brick-red color and are more evident at the periphery of the bulbar conjunctiva in the fornices than near the limbus. The small capillaries between the large vessels visible to the naked eye may be engorged if the congestion is marked, giving a diffuse redness to the whole conjunctiva, and petechial hemorrhages may be present. This is the form of congestion which gives rise to the lay term "pink eye," nearly always due to an acute infection of the conjunctiva (p. 208).

*Deep Congestion (Fig. 128).* This always indicates an involvement of the deeper structures of the eye or of the cornea. It is seen in iritis and keratitis. It may be present when a foreign body is imbedded in the cornea, when it signifies that the irritation of the eye is sufficiently severe to dilate the vessels supplying the iris and ciliary body. This form of congestion is to be looked for immediately around the limbus.



The individual vessels in this region are too small to be seen as such by the naked eye, but there will be a diffuse violaceous flush. If any vessels can be seen individually, they are straight, deep under the conjunctiva, and do not move when the overlying conjunctiva is



Fig. 2. Injection of the conjunctival blood vessels—superficial congestion.

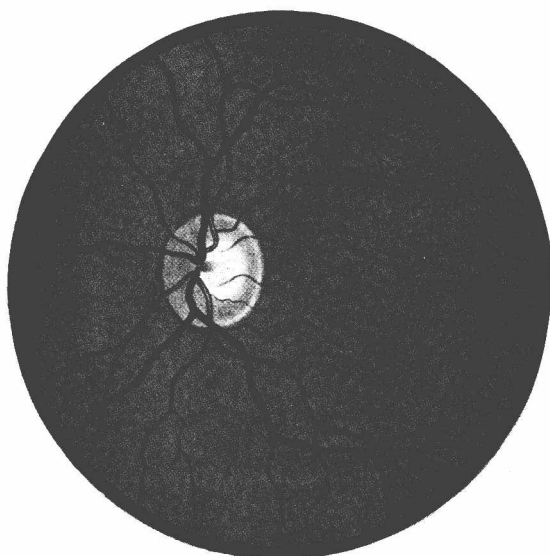


Fig. 3. The normal fundus with physiologic cupping (see p. 15).

moved gently with an applicator. This form of congestion is called a ciliary flush.

When one or the other form of congestion is present alone, there is seldom any doubt as to its character. Both types of congestion may be present, however. This is nearly always true in severe inflammatory conditions of the eye, so that it is not always easy to make a diagnosis of the underlying disease by this sign alone.

The size and color of the *pinguecula* should be noted. This is