

One Hundred Important Ophthalmology Books of the 20th Century

by

H. Stanley Thompson M.D. & Donald L. Blanchard M.D.

Introduction

We originally set ourselves to this project with the encouragement of Dr Albert, the Editor of the AMA Archives of Ophthalmology, but it kept growing until it was much too long to publish in the pages of the Archives. The alternative was to introduce the idea and the list of 100 books in the Journal with a very clear arrow -

<http://webeye.ophth.uiowa.edu/dept/20thCenturyBooks> - pointing to where the main text could be found on the internet. The fact that you are now reading this suggests that you have been able to follow that arrow. If you have stumbled on this by chance or by word of mouth you should know that this material started out in the Archives of Ophthalmology, and that the "arrow" is on pages 761-763, volume 119, issue 5, May 2001.

We have found the project to be interesting, enjoyable and intensely instructive, but at the end we found ourselves making some coin-toss decisions about rounding the collection out to exactly 100 titles. This made us uncomfortably aware of the imperfections of our list. We have recognized from the beginning that the mere act of presenting such a list is to ask for dissent and disparagement. To start with, what does "important" mean? Does it just mean popular? Is Duke-Elder on the list just because a lot of copies of his book were sold? It has been our hope to call a book "important" when there seems to be some agreement that the book has made a significant contribution to ophthalmic knowledge or practice. We concede that it often takes time for the word to get around about the excellence or significance of a certain book. This means that when a consensus has been reached there may well have been quite a few copies sold.

Some books published in the last decade of the 20th Century will continue to be useful and popular well into the 21st century, but so far, they have only had time to put their stamp on the 1990s. For this reason we have found it hard to evaluate them as 20th century monuments. By the year 2020 a general agreement may have finally been reached about the importance of these books. If our list is a little weighted towards the first half of the century, this delay may have been a contributing factor. By the

same token, some books first written in the 1890s continued, through new editions, to have a major influence into the 20th century, and we have included a few of these in our list. The result is that our definition of the 20th century is a little fuzzy at both ends.

Another problem with our list is that many of the most significant contributions to ophthalmic knowledge were first offered in professional journals, and the author never got around to writing a book on the subject. Ours is unabashedly a list of books. An objection might easily be raised that books are just one kind of retrievable information package, so why not consider all such packages in every kind of database? Our first answer is that we are fond of books. Books are not only discrete, compact and accessible, they also can be attractive because their physical qualities appeal to some of our other senses. The palpable heft of the book, the feel of the binding and the paper, the art and skill of the typography and illustrations are all part of "reading" a book. A book comes saturated with the personality and voice of the author; it is designed to be held in its owner's hands and to be read, shelved and re-read as needed. Our second reason is that we have to draw the line somewhere, and by limiting ourselves to books we have side-stepped the impossible task of writing a comprehensive History of Ideas in 20th Century Ophthalmology.

We have asked many others to give us their choices, but in the end this is our personal list, tilted inevitably by our own personal, American exposure to ophthalmic books and by our inclination towards the English language. We have made no attempt to rank all 100 of these books in order of their importance: we are not that foolhardy! We have listed them chronologically within eleven areas of ophthalmology. Our feeling is that there might be a fairly general agreement that most of these 100 ophthalmic titles deserve mention among the most influential of the century. The remainder will be on someone's list but not on everybody's.

Table of Contents

One hundred 20th century ophthalmic books arranged chronologically within each subspecialty area. The subspecialty areas themselves are arranged roughly in anatomical order from the front of the eye to the back of the eye.

General Ophthalmology

Norris and Oliver, *System of Diseases of Eye*, 1897-1900
Wood, Casey, *The Amer. Encycloped. of Ophth.*, 1913-1921
Berens, Conrad, *The Eye and its Diseases*, 1936-1949
Duke-Elder, Sir Stewart, *Text.&System Ophth.*, 1941-'72
Adler, Francis Heed, *Physiology of the Eye*, 1933-1992
May, Charles Henry, *Manual of Disease of Eye*, 1900-'73
Vaughan & Asbury, *Gen'l Ophthalmology*, 1958-1999
AAO, *Basic and Clinical Science Course*, 1940-2000
Grant, Morton, *Toxicology of the Eye*, 1962
Duane, *Clinical Ophthalmology*, 1976
Fraunfelder & Roy, *Current Ocular Therapy*, 1980
Spalton et al., *Atlas of Ophthalmology*, 1984
Albert & Jacobiec, *Principles & Pract Ophth'y.*, 1994

Cataract Surgery

Smith, Henry, *The Treatment of Cataract*, 1910
Arruga, *Cirurgia ocular*, 1946
Kirby, Daniel B., *Surgery of Cataract*, 1950
Kelman, Charles, *Phacoemulsification etc.*, 1975
Jaffe, Norman, *Cataract Surg. & Complic.*, 1972-97
Eisner, Georg, *Augenchirurgie*, 1973

Cornea & External Disease

Axenfeld, Theo, *The Bacteriology of the Eye*, 1908
Vogt, Alfred, *Atlas of the Slit Lamp*, 1921
Berliner, M. L., *Biomicroscopy of the Eye*, 1943-49
Castroviejo, Ramon, *Keratotomy & Keratoplasty*, 1964
Donaldson, David, *Atlas External Diseases of Eye*, 1966
Fedukowicz, Helena B., *External Infections of Eye*, 1963
Grayson, Merrill, *Diseases of the Cornea*, 1979
Krachmer, Mannis & **Holland**, *Cornea*, 1997

Glaucoma

Elliot, Robert, *Treatise on Glaucoma*, 1922
Uribe-Troncoso, M., *A Treatise on Gonioscopy*, 1947
Sugar, H. Saul, *The Glaucomas*, 1951
Becker & Shaffer, *Diag. & Therapy of Glaucomas*, 1961
Ascher, Karl, *The Aqueous Veins*, 1961
Chandler & Grant, *Lectures on Glaucoma*, 1965
Shields, M. Bruce, *Textbook of Glaucoma*, 1982
Anderson, Douglas, *Testing the Field of Vision*, 1982
Alward, Wallace L., *Color Atlas of Gonioscopy*, 1994

Neuro-ophthalmology

Wilbrand & Saenger, *Die Neurologie des Auges.*, 1900-1922
Posey & Spiller, *The Eye and Nervous System*, 1906
Inouye, Tatsuji, *Sehstörungen bei Schussverletzungen*, 1909
Traquair, Harry, *An Intro to Clinical Perimetry*, 1927
Cogan, David G., *The Neurology of Ocular Muscles*, 1945
Walsh, Frank, *Clinical Neuro-ophthalmology*, 1947
Bender, Morris, *The Oculomotor System*, 1964
Hoyt & Beeston, *Ocular Fundus in Neurol. Disease*, 1966
Smith & Glaser, *Neuro-ophth. Symp.*, 1965-1980
Leigh & Zee, *The Neurology of Eye Movement*, 1983
Loewenfeld Irene E., *The Pupil*, 1993

Optics & Refraction

Jackson, Edward, *Skiascopy and its pract'l applic.*, 1895
Gullstrand Allvar, *Monochromatische Aberrationen*, 1900
Obrig, Theo, *Contact Lenses*, 1942
Mandell, Robert, *Contact Lens Practice*, 1965
Milder & Rubin, *Fine Art Prescribing Glasses*, 1979

Pediatric Ophthalmology

Maddox, Ernest, *Tests & Studies of Ocular Muscles*, 1898-1935
Worth, Claud, *Squint*, 1903-1936
Howe, Lucien, *The Muscles of the Eye*, 1907-1908
Peter, Luther C., *The Extra-Ocular Muscles*, 1927
Bielschowsky, Alfred, *Lectures on Motor Anomalies*, 1940
Scobee, Richard, *The Oculoratory Muscles*, 1947
Burian & von Noorden, *Binoc. Vis. & Oc. Motility*, 1974

Hereditary Ocular Disease

Ishihara, Shinobu, *Ishihara Charts for Color Blindness*, 1917
Waardenburg PJ, *Das menschlichen Auge etc.*, 1932
François, Jules, *L'Hérédité en Ophtalmologie*, 1958
Franceschetti, François & Babel, *Héredo-dég.Ch.-rét.*, 1963
Krill, Alex, *Hereditary Retinal and Choroidal Diseases*, 1972

Retina & Vitreous

Ramon y Cajal, Santiago, *Structure of Retina*, 1894-1933
Woods, Alan C., *Endogenous Uveitis*, 1956
Gonin, Jules, *Le Décollement de la Rétine*, 1934
Meyer-Schwickerath, G., *Lichtkoagulation*, 1959
Schepens, Charles, *Retinal Detachment & Allied Dis.*, 1983
Cibis, Paul, *Vitreoretinal Path.*, *Surg.Retinal Detach.*, 1965
Gass, J.D., *Stereoscopic Atlas of Macular Disease*, 1970
Shields, Jerry, *Intraocular Tumors*, 1983
Ryan, Stephen J., *Retina*, 1989

Oculoplastic Surgery

Czermak, Wilhelm, *Augenärztlichen Operation*, 1907-1908
Meller, Josef, *Ophthalmic Surgery*, 1908
Whitnall, S. Ernest, *Anatomy of the Human Orbit*, 1921
Sheehan, J. Eastman, *Plastic Surgery of the Orbit*, 1927
Wheeler, John Martin, *The Collected Papers of JMW.*, 1939
Spaeth, Edmund, *New Meth of Ophthal Plastic Surg.*, 1925
Hughes, W. L., *Reconstructive Surgery of the Eyelids*, 1943
Stallard, H. B., *Eye Surgery*, 1946
Fox, Sidney A., *Ophthalmic Plastic Surgery*, 1952
Mustardé, J. C., *Repair and Reconstr. of Orbital Region*, 1966
Beard, Crowell, *Ptosis*, 1969
Jones & Wobig, *Surgery of Eyelids & Lacrim. Syst.*, 1976
Henderson, John W., *Orbital Tumors*, 1973
Dutton, Jonathan, *Atlas Clin. & Surg. Orbit Anat.*, 1994

Ocular Anatomy and Pathology

Fuchs, Ernst, *Lehrbuch der Augenheilkunde*, 1889-1945
Parsons, J. Herbert, *The Pathology of the Eye*, 1904-1908
Salzmann, Maximilian, *Anat. & Histo. des Auges*, 1912
Fuchs, Adalbert, *Atlas of the Histopathology of Eye*, 1924
Mann, Ida Caroline, *Development of the Human Eye*, 1928
Collins & Mayou, *Pathol. & Bacteriology of the Eye*, 1918
Wessely, Karl, *Auge, (Henke-Lubarsch)*, 1928-1937
Wolff, Eugene, *The Anatomy of the Eye and Orbit*, 1933
Reese, Algernon, *Tumors of the Eye*, 1951
Friedenwald Jonas et al., *Ophthalmic Pathology*, 1952
Hogan and Zimmerman, *Pathology of the Eye*, 1962
Spencer, William, *Ophthalmic Pathology*, 1985
Hogan, Alvarado & Weddell, *Histology of the Eye*, 1971

Check List

One hundred 20th Century ophthalmic books, arranged alphabetically by author.

- AAO**, *Basic and Clinical Science Course*, 1940-2000
Adler, Francis Heed, *Physiology of the Eye*, 1933-1992
Albert & Jacobiec, *Principles & Practice of Ophth.*, 1994
Alward, Wallace L., *Color Atlas of Gonioscopy*, 1994
Anderson, Douglas, *Testing the Field of Vision*, 1982
Arruga, H., *Cirurgia ocular*, 1946
Ascher, Karl, *The Aqueous Veins*, 1961
Axenfeld, Theo, *The Bacteriology of the Eye*, 1908
Beard, Crowell, *Ptosis*, 1969
Becker & Shaffer, *Diagnosis & Ther. of Glaucomas*, 1961
Bender, Morris, *The Oculomotor System*, 1964
Berens, Conrad, *The Eye and its Diseases*, 1936-1949
Berliner, M. L., *Biomicroscopy of the Eye*, 1943-49
Bielschowsky, Alfred, *Lectures Motor Anomalies*, 1940
Burian & von Noorden, *Binoc. Vis. & Oc. Motil*, 1974
Castroviejo, Ramon, *Keratotomy & Keratoplasty*, 1964
Chandler & Grant, *Lectures on Glaucoma*, 1965
Cibis, Paul, *Vitreoretinal Path., Surg. Retin Detach.*, 1965
Cogan, David G., *Neurology of the Ocular Musc.*, 1945
Collins & Mayou, *Pathol. and Bacteriol. of the Eye*, 1918
Czermak, Wilhelm, *Augenärztlichen Operat.*, 1907-1908
Donaldson, David, *Atlas of Extern. Dis. of the Eye*, 1966
Duane, Thomas, *Clinical Ophthalmology*, 1976
Duke-Elder, Sir Stewart, *Text. & Syst. Ophth*, 1941-1972
Dutton, Jonathan, *Atlas Clin. & Surg. Orbit Anat.*, 1994
Eisner, Georg, *Augenchirurgie*, 1973
Elliot, Robert, *Treatise on Glaucoma*, 1922
Fedukowicz, Helena B., *Extern. Infections of Eye*, 1963
Fox, Sidney A., *Ophthalmic Plastic Surgery*, 1952
Franceschetti, François & Babel, *Hérédo-dég. Ch-rét.*, 1963
François, Jules, *L'Hérédité en Ophthalmologie*, 1958
Fraunfelder & Roy, *Current Ocular Therapy*, 1980
Friedenwald, Jonas et al., *Ophthalmic Pathology*, 1952
Fuchs, Ernst, *Lehrbuch der Augenheilkunde*, 1889-1945
Fuchs, Adalbert, *Atlas of Histopath of Eye*, 1924
Gass, J.D., *Stereoscopic Atlas of Macular Disease*, 1970
Gonin, Jules, *Le Décollement de la Rétine*, 1934
Grant, Morton, *Toxicology of the Eye*, 1962
Grayson, Merrill, *Diseases of the Cornea*, 1979
Gullstrand, Allvar, *Monochromatische Aberrationen*, 1900
Henderson, J.W., *Orbital Tumors*, 1973
Hogan, Alvarado & Weddell, *Histology of the Eye*, 1971
Hogan & Zimmerman, *Pathology of the Eye*, 1962
Howe, Lucien, *The Muscles of the Eye*, 1907-1908
Hoyt & Beeston, *Ocular Fundus in Neurol. Disease*, 1966
Hughes, Wendell L., *Reconstructive Surg. of Eyelids*, 1943
Inouye, Tatsuji, *Sehstörungen bei Schussverletzungen*, 1909
Ishihara, Shinobu, *Ishihara Charts for Color Blindness*, 1917
Jackson, Edw., *Skiascopy and its practical application*, 1895
Jaffe, Norman, *Cataract Surgery and its Complic.*, 1972
Jones and Wobig, *Surg. of Eyelids & Lacrim. Syst.*, 1976
Kelman, Charles, *Phacoemulsification etc.*, 1975
Kirby, Daniel B., *Surgery of Cataract*, 1950
Krachmer, J.H., Mannis, M., & Holland, E., *Cornea*, 1997
Krill, Alex, *Heredit. Retinal & Choroidal Diseases*, 1972
Leigh & Zee, *The Neurology of Eye Movement*, 1983
Loewenfeld, Irene E., *The Pupil*, 1993
Maddox, Ernest, *Tests & Studies of Ocular Musc.*, 1898
Mandell, Robert, *Contact Lens Practice*, 1965
Mann, Ida Caroline, *Development of Human Eye*, 1928
May, Charles Henry, *Manual of Diseases of the Eye*, 1900-'73
Meller, Josef, *Ophthalmic Surgery*, 1908
Meyer-Schwickerath, G., *Lichtkoagulation*, 1959
Milder & Rubin, *Fine Art Prescribing Glasses etc.*, 1979
Mustardé, J. C., *Repair and Reconstr. of Orbital Region*, 1966
Norris and Oliver, *System of Diseases of Eye*, 1897-1900
Obrig, Theo, *Contact Lenses*, 1942
Parsons, J. Herbert, *The Pathology of the Eye*, 1904
Peter, Luther C., *The Extra-Ocular Muscles*, 1927
Posey and Spiller, *The Eye and Nervous System*, 1906
Ramon y Cajal, Santiago, *Structure of Retina*, 1894-1933
Reese, Algernon, *Tumors of the Eye*, 1951
Ryan, Stephen, *Retina*, 1989
Salzmann, Maximilian, *Anat. & Histol. des mensch. Au.*, 1912
Schepens, Charles, *Retinal Detachment Surgery*, 1983
Scobee, Richard, *The Oculorotory Muscles*, 1947
Sheehan, J. Eastman, *Plastic Surgery of the Orbit*, 1927
Shields, M. Bruce, *Textbook of Glaucoma*, 1982
Shields, Jerry, *Intraocular Tumors*, 1983
Smith, Henry, *The Treatment of Cataract*, 1910
Smith & Glaser, *Neuro-ophth. Symp.*, 1965-1980
Spaeth, Edmund, *New. Meth. of Ophthal Plastic Surg.*, 1925
Spalton & Hitchings, *Atlas of Ophthalmology*, 1984
Spencer, William, *Ophthalmic Pathology*, 1985
Stallard, H. B., *Eye Surgery*, 1946
Sugar, H. Saul, *The Glaucomas*, 1951
Traquair, Harry, *An Intro. to Clinical Perimetry*, 1927
Uribe-Troncoso, Manuel, *A Treatise on Gonioscopy*, 1947
Vaughan & Asbury, *General Ophthalmology*, 1958-1999
Vogt, Alfred, *Atlas of the Slit Lamp*, 1921
Waardenburg, P.J., *Menschlichen Auge*, 1932
Walsh, Frank, *Clinical Neuro-ophthalmology*, 1947
Wessely, Karl, *Auge. (Henke-Lubarsch)*, 1928-1937
Wheeler, John Martin, *The Collected Papers of JMW.*, 1939
Whitnall, S. Ernest, *The Anatomy of the Human Orbit*, 1921
Wilbrand and Saenger, *Die Neurologie des Auges.*, 1900-1922
Wolff, Eugene, *The Anatomy of the Eye and Orbit*, 1933
Wood, Casey, *The American Encycloped. of Ophth.*, 1913-1921
Woods, Alan C., *Endogenous Uveitis*, 1956-61
Worth, Claud, *Squint*, 1903-1936

General Texts and Encyclopedias

In the middle of the 19th Century, with the invention of the ophthalmoscope by Helmholtz and the brains and energy of Albrecht v. Graefe, ophthalmic knowledge seemed to be exploding and ophthalmology soon became a recognized specialty of medicine. After a few decades the need was felt to summarize all this new knowledge. In Germany this was done, with astonishing thoroughness, under the editorship of Alfred Graefe and Theodor Saemisch (the Graefe-Saemisch Handbuch der gesamten Augenheilkunde, 1874-1880) and in France by deWecker and Landoldt (Traité Complet d'Ophthalmologie, 4 volumes, 1880-1889) and after the turn of the century by Lagrange of Bordeaux and Valude of Quinze-Vingts, Paris (Encyclopédie française d'Ophthalmo-logie, 9 volumes, Octave Doin, Editeur, Paris, 1903-1910.

Norris, Wm. F. & Oliver, Chas. A. *A System of Diseases of the Eye.* Philadelphia, J.P. Lippincott, 1897-'00.

This massive four-volume work was a multi-authored compendium edited by Norris and Oliver. There were many illustrious contributions, including a large chapter by Hermann Wilbrand on perimetry, summarizing 19th century advances in the anatomy of the visual pathways and the intracranial lesions that produced visual field defects; and a lengthy section on glaucoma by Priestley Smith. This four volume "System", which was seen as an American version of the famous French text by deWecker and Landoldt, grew out of the very popular single volume "Text-Book of Ophthalmology" by the same authors (Philadelphia, Lea Brothers, 1893). Their decision to switch to a multi-authored, multi-volume version promptly made their "Textbook" obsolete, even though it had already been translated into Chinese. The "System" was never revised. Their original "Textbook" had appeared in 1893 on the heels of two remarkable one-volume ophthalmology texts: Duane's translation of Ernst Fuchs' Lehrbuch in 1892, and George DeSchweinitz's 1892 "Diseases of the Eye". Both of these texts stuck to the one-volume format and persisted through 10 editions in English.

Wood, Casey A. (ed) *The American Encyclopedia and Dictionary of Ophthalmology.* Chicago, Cleveland Press, 1913-1921 (18 vols). More than 100 ophthalmologists contributed to this work, with Thomas Hall Shastid writing about 10% of the entire set (including 3000 biographical sketches and a 375 page history of ophthalmology). This massive set of books underlined for the public and for the medical profession that ophthalmology, even though it dealt with a small organ, had

considerable content that required many years of concentrated study and practice to master. At approximately the same time (1916-17), the first voluntary medical specialty certifying board in America was founded: the American Board of Ophthalmology.

Berens, Conrad. *The Eye and its Diseases, by 82 international authorities.* Philadelphia, W B Saunders, 1936. This book was exceedingly popular, and after the war, in 1949, a second edition was put together, still in one volume, with contributions by even more international authorities. Berens must have been a persuasive man and a skillful editor because the book runs smoothly along with succinct summaries of knowledge by various well-known authors.

Duke-Elder, Sir Stewart. 1. *Textbook of Ophthalmology* (7 volumes, 1941-1954) 2. *System of Ophthalmology*, (19 volumes, 1958-1972). **UK editions, London, Henry Kimpton; US editions, St Louis, Mosby.** The "Textbook of Ophthalmology" began in the late 1930s, and was just getting going when the world war started. The second half of the set was written after the war. This delay made the first volumes seem old, and rather than do them over again, Duke-Elder undertook to edit a much more comprehensive, multi-authored "System of Ophthalmology".

Duke-Elder's "System" was sold all over the world as the ultimate compendium of ophthalmic knowledge, although it was deliberately short on surgical procedure. Duke-Elder felt that surgical technique was a fleeting skill, a slave to fashion, and a mere technical servant of the art and science of ophthalmology. This attitude may have served as a subtle damper on innovation and progress in ophthalmic surgery. Duke-Elder's special talent was in summarizing a great

jumble of information into a single smoothly written, helpful paragraph; his astonishingly retentive memory and his encyclopedic output allowed him to stand like a Colossus astride the middle 40 years of the ophthalmic century. The System of Ophthalmology was highly valued: a young American ophthalmologist who collected the entire 19 volumes in the 1960s may have paid 5% of one year's income for the set. Like most sets of books that take more than a decade to complete, the System was barely finished before it was seen as getting a little long in the tooth. None of the great surgical advances of the last generation can be found in this set, but it is still a gold mine of information on the ophthalmic basic sciences and it will always have value because of the author's fascination with the history of his specialty.

Adler, Francis Heed *Physiology of the Eye. Clinical Application. St Louis, Mosby, 1992.* The first edition of this book appeared in 1950; 2nd edition, 1953; 3rd edition, 1959; 4th edition, 1965; 5th edition, a multi-authored volume edited and in part re-written by Robert Moses, was published in 1970; 6th edition, Moses, 1975; 7th edition, Moses, 1981; 8th edition, Moses & W.M. Hart, 1987; 9th edition, Hart, 1992.

This famous text had its start in 1933 with a book by Adler called *Clinical Physiology of the Eye*, New York, The Macmillan Company, 1933. The book was appreciated and admired and it filled a void, but physiology is a moving target, and Adler admitted that he had limited himself to those aspects of ocular physiology that sparked his interest. Almost twenty years went by before Adler attempted an update, and this time the book had a new publisher. As the new title suggests, he still wanted to discuss ocular physiology in the context of a related clinical problem. "Adler's Physiology of the Eye" has become a highly respected textbook of almost 900 pages, used throughout the world in the training of ophthalmologists; it is the envy of other medical specialties.

May, Charles Henry. *Manual of Diseases of the Eye. New York, William Wood, 1900.* Dr. May graduated near the top of his Columbia medical school class at age 22 and after 2 years as a junior assistant at Mt Sinai Hospital began a medical practice. He was influenced by

Cornelius Agnew, his professor of ophthalmology at Columbia, to take up the study of the eye, and undertook to spend 14 months in Europe. Upon returning to New York he received appointments at many hospitals and eventually directed the ophthalmology service at Bellevue. At age 39 he not only introduced a new double disc ophthalmoscope, but also published this little book addressed to medical students and general practitioners. Both were very popular. The book contained 22 colored plates, most of them fundus drawings, all of them done by Dr. May. He worked hard at keeping the book up to date. By 1917 there had already been 18 printings of the first 8 U.S. editions and the ninth edition had arrived. The book had been translated into seven different languages and a British edition had been supervised by Mr. Claud Worth. When Dr. May died in 1943 the book had gone through 18 U.S. editions and had been translated into 10 languages. For many years almost every medical student bought a copy. The book continued as "May's Manual" for another 30 years under the editorship first of Dr. Charles Perera, and then Dr. James H. Allen. All told, there were about 80 editions of this book published in various languages over the years, and many of them were reprinted more than once.

Vaughan, Daniel & Asbury, Taylor. *General Ophthalmology. Los Altos, CA. Lange Medical Publications, 1958.* This is another book about ophthalmology that is not intended for ophthalmologists. It has always been in a modest, yellow, soft cover. In the 1960s it challenged Charles May's Manual of Diseases of the Eye and soon took over as the most popular summary of ophthalmology for medical students and general practitioners. It was translated into several languages and has served many doctors as an introduction to modern ophthalmology. It offers just what the general medical practitioner needs to know about ophthalmology: a basic understanding of the problem and a sense of when to refer the patient to a specialist. (15th edition 1999, with Riordan-Eva, P. Appleton, Lange).

American Academy of Ophthalmology. *Basic and Clinical Science Course. San Francisco, CA A.A.O. 1940-2000.* In 1938, Dr Harry Gradle of Chicago proposed that the American

Academy of Ophthalmology start a Home Study Course for ophthalmologists in training. When it got rolling in 1940 - again because of Dr. Gradle's energetic support - far more practitioners than residents signed up, but after the war the residents began signing up in droves. Booklets that surveyed a subspecialty area were written by well-known ophthalmologists (for example, Saul Sugar, Wilbur Rucker, Bruce Fralick), and a "faculty" of volunteer Academy members compiled reading lists, prepared questions and individually graded the written examinations.

In 1970 the course was restructured and its name was changed to the Basic and Clinical Science Course, or "BCSC" for short. By 1975 it was clearly aimed at both ophthalmologists in training and at ophthalmologists in practice. Every year a set of about 10 volumes was published, each volume devoted to a particular "section" of ophthalmic knowledge.

The set has now grown to 12 substantial books with readable text (rather than bare outlines) and with color photos throughout, plus an index volume; and plans are being made for a 13th volume. Each year three of these books are rewritten from the ground up by a fresh subcommittee, while the rest are edited lightly every year by the same team that put them together. Thus the entire set is rewritten about every four years.

The American Academy of Ophthalmology, through the "BCSC", has been distributing fresh ophthalmic knowledge throughout the world for the last 60 years. The complete set now runs to 4200 printed pages, and about 1350 of these sets are sold every year (25% of them overseas). The total press run is in the neighborhood of 26,000 volumes each year - and every year any left over books are sent free to needy ophthalmology training institutions around the world. This massive project has been of incalculable benefit to the quality of ophthalmic care in this century.

Grant, Morton, (1915-). *Toxicology of the Eye*. **Charles C. Thomas, Springfield, IL, 1962** 2nd ed. 1974; 3rd ed. 1986; 4th ed. with Joel Schuman, 1993). This office reference work has been nurtured along through several editions by Dr. Grant, the pioneering Boston glaucomatologist. The book is a fat, but readily accessible, clinical work with clear descriptions and good documentation. It is the

book to turn to when considering the ocular toxic side effects of various drugs and preparations. The listing of both generic and trade names of medicines makes this especially helpful in practice. Lately the text has benefited greatly from Dr. F. Fraunfelder's National Drug Registry to keep up-to-date on new areas of toxicity as they emerge as patterns.

Duane, Thomas. *Clinical Ophthalmology*. **New York, Harper and Row, 1976**. This innovative text was designed to be always up-to-date. It was bound in a set of six sturdy 3 ring binders and it was hoped that every owner would become a subscriber. Revised chapters were sent by mail to replace the old chapters (a plan reminiscent of the Academy of Ophthalmology's Basic and Clinical Sciences Course). Every year a few chapters were redone, so that in 4 or 5 years the whole set of volumes would be revised. The set is now called "Duane's Clinical Ophthalmology". For more than 20 years it has been a very influential textbook.

Dr. Duane was Professor of Ophthalmology at Jefferson Medical College and Ophthalmologist-in-Chief at Wills Eye Hospital in Philadelphia. He was a lifetime teacher and he was interested in helping the practicing ophthalmologist to make informed judgments about a patient's diseases and treatments in the midst of a busy schedule. He was also addressing doctors who were in the process of Board Certification and licensing. Duane recruited the first group of section editors and many contributors then helped to prepare concise chapters. Dr. Duane died in 1993 and his associate editors Edward Jaeger and William Tasman have kept the project going. In 1982 a parallel set of loose leaf books was started emphasizing the basic sciences of Ophthalmology; it was called "Duane's Foundations of Clinical Ophthalmology". The updates for both sets, under the same editorship, are now supplied by Lippincott-Williams and Wilkins.

Fraunfelder, F. & Roy, F. H. *Current Ocular Therapy*. **Philadelphia, Saunders 1980** (5th edition 2000). The entries in this book are by various authors and they cover almost every disease a practicing ophthalmologist might encounter. Each entry offers a brief

description of how the diagnosis is confirmed and then summarizes current treatment. Some ophthalmologists see this book as merely a condensed version of material that can be found in instructive detail elsewhere, however a great many ophthalmologists have found this book very useful and comforting; they have a copy to help them through a busy day at the office and an extra copy at home.

Spalton, David J., Hitchings, Roger A., Hunter, Paul A. Atlas of Clinical Ophthalmology. **London, Gower Medical Publishing, 1984**, and in US Philadelphia, Lippincott, 1984. (2nd ed., Wolfe/Mosby/Yearbook, 1994). This is a masterpiece of medical book design: it is a large book (a double page spread is 12" by 20") with two columns per page. The photos throughout are clean, and uncluttered by arrows and letters. Each has a matching, adjacent, computer-generated diagram with arrows identifying the important parts. All the graphs and charts have been re-drawn with the same pastel palette of pale green, blue or yellow so that

they don't jar the page. Any ophthalmologist riffling through the enlarged 2nd edition is dazzled by 537 pages of irresistible visual delights. It is not surprising that this book has been such a popular and effective teaching tool.

Albert, Daniel M & Jacobiec, Frederick A. *Principles and Practice of Ophthalmology.* **Philadelphia, W.B. Saunders, 1994** (2nd edition 2000). This work was started while both the authors were at the Massachusetts Eye and Ear Infirmary. Both are ophthalmic pathologists. Jacobiec is chair at MEEI and Albert is now chair at the University of Wisconsin. This book was begun as a Harvard project, but quickly outgrew this focus as they recruited experts across the country as contributors. This set of 6 books is one of the best single summaries of ophthalmic knowledge since Duke-Elder, and might well be a modern clinical ophthalmologist's "desert island" choice.

Cataract Surgery

At the beginning of the century Hermann Knapp of New York was strongly recommending taking the entire cataractous lens out of the eye with its capsule intact. He liked to tumble the lens on its way out. In 1917 Ignacio Barraquer of Barcelona invented a little suction cup that he called an erysophake. With this suction he could grip the lens firmly and remove it without tearing the capsule. In 1949 Harold Ridley of London boldly tried to replace the cataractous crystalline lens with an intraocular acrylic lens. He had trouble securing the lens in the posterior chamber so he tried fixating the lenses in the anterior chamber angle. Most patients ended up with a cloudy cornea and glaucoma and had to have the plastic lenses removed. Joaquin Barraquer tried Ridley's lenses with similar bad results and ended up in 1958 offering a way of dissolving the supporting zonules with an enzyme ("alpha-chymotrypsin zonulolysis") thus contributing to the continuing popularity of intracapsular surgery. Binkhorst, despite Ridley's failure, had the courage in 1958 to try a 4-loop iris-clip plastic intraocular lens, and then offered a 2-loop iridocapsular lens in 1965. Krasner suggested sponging up the anterior vitreous. Cryoextraction of the lens was introduced by Krawicz in 1961. Kelman introduced phacoemulsification in 1967, and gradually the advantages of the small incisions, extracapsular extraction and the new posterior chamber lenses won over the profession.

Smith, Henry. *The Treatment of Cataract.* **Calcutta, Thacker, Spink & Co, 1910.** Lt.-Colonel Smith of the Indian Medical Service, who was famous for his ever-present cigar, had done over 24,000 cataract extractions in northern India when he wrote this book. He liked to slip the entire lens out of the eye through a Graefe knife incision, with a curved spatula under the lens and a bulbous-tipped

lens hook pressing the cornea against the lower half of the lens. The on-the-spot pen and ink sketches of every step by Derrick T. Vail and the huge experience of Colonel Smith served to popularize intracapsular cataract extraction by the "Smith-Indian" technique.

Arruga, Hermengildo (1886-1972). *Cirugia ocular*. **Barcelona, Salvat Editores, 1946** (The 3rd edition was translated into English as *Ocular Surgery* by Hogan & Chapparo, NY, McGraw-Hill, 1952; There were 5 Spanish editions and translations into 3 languages). Arruga was the brilliant son of a Barcelona ophthalmologist who began his medical studies at age 16. At 21 he was studying ophthalmology in France and Germany with Landolt, de Lapersonne and Hirschberg. He later embraced Gonin's new treatment for retinal detachment. He lived a long and admirably full life. This well-made and handsomely illustrated volume was an important source of instruction for 20 years.

Kirby, Daniel B. (1891-1953) *Surgery of Cataract*. **Philadelphia, J.B. Lippincott, 1950**. This book, assembled with great care, appeared at the peak of the popularity of intracapsular cataract extraction. It is printed on high quality paper and has 339 in-text figures and 21 color plates, each with 2 or 3 paintings by Gus Bethke. At every opportunity Kirby emphasizes the history of cataract surgery, often illustrating his point with a vignette or comment from the old literature. Every student of modern cataract surgery ought to read this book. The technical aspects may already be 50 years behind the times but the patients and their cataracts are the same, and Kirby's knowledge, experience and humanity come through. Kirby's follow-up book (*Advanced Surgery of Cataract*, 1955) lays out his own preferred techniques and addresses the management of complications. It is clearly just an appendix to his 1950 book.

Kelman, Charles (1930-). *Phacoemulsification and Aspiration: the Kelman Technique of Cataract Removal*. **Birmingham, Ala., Aesculapius Pub. Co., 1975**. Kelman was as innovative to cataract surgery in the 20th century as Daviel was in the 18th. In 1967 he introduced phacoemulsification. He entered the eye through a small incision, removed the anterior capsule of the lens, and then using an ultrasound probe he fragmented the clouded lens and removed every scrap of it by suction, leaving the posterior capsule suspended by the intact zonules as a hammock for the plastic replacement lens. The response was prompt and mostly negative as outlined in his auto-

biography, (*Through My Eyes: The Story of a Surgeon Who Dared to Take on the Medical World*, New York, Crown, 1985). The procedure has of course been modified a great deal in the last generation, but Kelman's phaco-emulsification has become the standard cataract procedure throughout the world, and today we expect cataract surgery to have a minimal recuperation time, and each year we expect ever more flexible and forgiving posterior chamber lenses. (See also: *The History of Modern Cataract Surgery* by Charles Kelman and Marvin Kwitko, Kugler Publications, 1998)

Jaffe, Norman S. *Cataract Surgery and its Complications*. **St Louis, C V Mosby, 1972**. When this book first appeared it came across as a lone, thoughtful voice in an exciting new field. It is now in its 6th edition (1997) with younger Jaffes as co-authors. This series has kept up with cataract surgery during the period of greatest innovation and change since Daviel by serving up to a generation of surgeons a dependable and nourishing diet of instruction on new tricks and techniques, garnished with cautionary notes and supported by the steadying voice of experience.

Eisner, Georg. *Augenchirurgie : Einführung in die operative Technik*. **Berlin, Springer Verlag, 1973** (1st US edition 1980, 189pp; 2nd US edition 1990, 318pp. Translated into English by T.C. Telger as *Eye Surgery: an Introduction to Operative Technique*). Eisner teaches ophthalmology at Goldmann's department at the University of Bern. A book like this is just what every teacher of ophthalmic surgery needs to help answer questions, and what every would-be eye surgeon needs to own and study. Instead of merely mimicking his master, the student can find in this book a lucid explanation of why the knife should be held just so, and the knot tied left over right, etc. It has many helpful, easy-to-understand, two-color diagrams by Peter Schneider, diagrams that no doubt helped the 1973 edition to be named as one of the "Fifty Most Beautiful German Books of the Year" by the Book Art Foundation of the Association of the German Book Trade.

Cornea and External disease

Axenfeld, K. Theodor P. P. (1867-1930) *The Bacteriology of the Eye* (Translated from the German by Angus McNab). **London, Ballière, Tyndall & Cox, 1908, and New York, William Wood & Co, 1908.** Victor Morax (1866-1935) of Paris wrote a chapter in the *Encyclopédie française d'Ophtalmologie*, (Paris, Octave Doin, 1903-1910) on the bacteriology of conjunctival disease. Axenfeld who became professor at Freiburg, expanded on his friend and colleague's chapter and brought together other material to produce a textbook in 1908 that became very influential. Axenfeld's book popularized the clinical use of the Gram stain.

Vogt, Alfred (1879-1943). *Lehrbuch und Atlas der Spaltlampen-mikroskopie des lebenden Auges*, 2nd edition. **Berlin, Springer, 1930-31, Stuttgart, Ferdinand Enke, 1942.** The first version of this amazing three-volume atlas appeared in 1921 as a single slim volume dedicated to Allvar Gullstrand, the inventor of the slit lamp (*Atlas der Spaltlampen-mikroskopie des lebenden Auges*, Berlin Springer, 1921). An English version of 153 pages also appeared at the same time, translated by Robert von der Heydt of Chicago, and also printed by Brockhaus in Leipzig (*Atlas of the Slit Lamp-Microscopy of the Living Eye* Berlin, Julius Springer, 1921). Vogt was Professor and head of the ophthalmology department at Zürich from 1923-1943. He worked with diathermy in the treatment of glaucoma and retinal detachment, but his major contribution was in the clinical use of the slit lamp. In 1920 Gullstrand's new instrument was still uncommon, but Vogt, then director of the University Ophthalmic Hospital in Basel, turned it into an indispensable part of the modern eye examination. He contrived to narrow the light beam, brighten and simplify the light source, and focus the light on the slit. The resultant even, narrow beam required some dark adaptation in the observer, but detail was seen as never before. Then he used his modified slit lamp to perform techniques of focal illumination, transillumination, specular examination and indirect lateral

examination. These are all well described in his text, but it is the illustrations by Jakob Iseli that leap off the page and still bring gasps of admiration from modern ophthalmologists because of the exquisite attention that was paid to the minutest details. It is obvious from the drawings that Iseli was facile with the instrument and understood what he was seeing: his paintings are often composites of what could be seen at different planes of focus, and in those first slit lamps the center of rotation of the lamp and the microscope were not co-axial. And imagine the work of keeping a hot, smoking, sparking and sighing arc lamp constantly tuned up while he was drawing.

In 1925 Vogt hired Bregenzer as an artist and taught him to paint what he saw in the slit lamp with the same kind of breath-taking detail. A much enlarged three-volume edition then came out between 1930 and 1942, (Vol I, Berlin, Springer, 1930; Vol II, Berlin, Springer, 1931; Vol III, F. Enke, Stuttgart, 1942. At about the same time Volume 3 also appeared locally in Zurich, in an English translation). Many of Iseli's paintings were incorporated into this new edition, but all the new ones were by Bregenzer. It was the magnitude of this work and the excellence of the paintings that brought fame to Vogt, and the book is once again in print. In 1977 a luxury edition was brought out in German by Wayenborgh Publishing and the same company then published an English translation by Blodi (Vol I, 1978; Vol 2, 1979) and in 1981 a reprint of the Zürich English version of the 3rd volume.

Berliner, M. L. *Biomicroscopy of the Eye*. New York, **Paul B. Hoeber, 1943-1949.** Vol 1 appeared in 1943 and was reprinted in 1949 when the second volume came out. Berliner taught slit lamp biomicroscopy at various New York hospitals, and these volumes are a spare-no-expense effort to put these clever techniques and beautiful images between the covers of a book. Zeiss slit lamps were used and it seems that the electric bulbs suffused these images with a warmth that was not present in Iseli's arc-lamp drawings. The paintings by J. McGuinness Myers in Berliner's

book also have a style that differs from those in Vogt's atlas. Iseli's paintings suggest the notes of a meticulous explorer, scrupulously accurate, recording every detail no matter how trivial; but there is a teacher looking over McGuinness Myers' shoulder, asking for emphasis where it is clinically important. This gives the Berliner/Myers pictures a confident air of certainty that makes them better teaching instruments.

Castroviejo, Ramon (1904-1987). *Atlas de queratectomías y querato-plastias*. **Barcelona, Salvat Editores, 1964**; English edition, *Atlas of Keratectomy and Keratoplasty*, Phila, Saunders, 1966; German edition *Keratektomie und Keratoplastik* (translated and edited by F. Hollwich) Stuttgart, G. Thieme Verlag, 1968. Castroviejo was born in northern Spain, the son of an ophthalmologist. At age 24, having completed medical school and ophthalmic training, he accepted a position as an assistant at the Chicago Eye & Ear Hospital. The next year he was working at experimental corneal transplantation under Dr Benedict at the Mayo Clinic, and the following year (1931) he was invited by Dr Maynard Wheeler to New York's Columbia Presbyterian. Within a few years Castroviejo was making successful square corneal grafts in humans. The square graft remained his signature procedure until the early 1950s. He opened his own eye hospital in New York in the 1940s, and patients were sent to him from all over the world. Castroviejo was a pioneer of corneal transplantation and he trained many corneal surgeons. It was his drive and energy that produced the techniques and the instruments that made corneal grafting a successful operation. His book summarized his work and the latest technology of the day.

Donaldson, David D. *Atlas of External Diseases of the Eye. Vol 1 Congenital anomalies and systemic diseases. St Louis, C V Mosby, 1966. (Vol 2, Orbit, lacrimal apparatus, eyelids and conjunctiva, 1968. Vol 3, Cornea and Sclera, 1971. Vol 4, Anterior Chamber Iris, and Ciliary Body, 1973. Vol 5, The Crystalline Lens, 1976)* The stereophotographs in these books, taken with the "Donaldson camera", brought external disease to life.

Fedukowicz, Helena B. *External Infections of the Eye : bacterial, viral and mycotic. NY, Appleton Century Crofts 1963.* Helena Biantovskava Fedukowicz (1900-1998) was born in the Ukraine and educated in the Soviet Union, where she eventually became a professor of Ophthalmology at Vinniza with an interest in infectious disease. She arrived in the US in 1949. After some English lessons, she got a job, through the efforts of Dr George Wise, running an ophthalmic bacteriology laboratory at New York University supported by the NYU chairman, Dr. Alson E. Braley. Her book, on the clinical bacteriology of the eye was the first written in English and the first since Axenfeld's book. Beatrice Glover had drawn an excellent series of color plates, but the publisher refused to use them saying that color would be too expensive. Fedukowicz insisted that color was essential. This impasse was broken when an anonymous donor paid the cost of the plates. The book became very popular and was used widely in teaching institutions; subsequent co-authored editions appeared in 1978 and 1985, with a Spanish edition in 1987. Fedukowicz was elected an Honorary Fellow of the American Academy of Ophthalmology in 1982. Later it came out that the anonymous donor was Dr. George Wise. (see: Baum, Jules. Helena B. Fedukowicz, *Documenta Ophthalmologica* 99:215-218, 1999

Grayson, Merrill. *Diseases of the Cornea. St Louis, C.V.Mosby, 1979.* (2nd ed. 1983; 3rd ed. by R. Arffa, 1991; 4th ed. by R. Arffa, 1997). This one volume introduced the ophthalmologist in training to corneal disease. It was thorough, well-organized and richly illustrated with color photographs that seemed unusually clear and expressive. It proved to be very popular.

Krachmer, J. H., Mannis, Mark & Holland, Edward. *Cornea.* St Louis, C.V.Mosby, 1997.

The medical illustrator involved with this project was Martin Finch. It started with a spectacular atlas (Krachmer, Jay H. and Palay, David, Color Atlas, Mosby, 1995) and went on

to a three volume text (Vol 1: Fundamentals; Vol 2: Diagnosis and Management; Vol 3: Surgery). With 250 contributors it must have been a staggering editorial job, but there is no doubt that it is now the most complete compendium available on the subject.

Glaucoma

In 1857 von Graefe found that taking out a large piece of the iris seemed to help many patients with glaucoma (Graefe's Archiv 3:456, 1857, and then 4:127, 1858; 8:242, 1862; and 15:108, 1859). Graefe's early work on this subject was translated into English and published by the New Sydenham Society in 1859). Eserine eye drops, made from the Calabar bean, were used before iridectomy to produce a miosis so that the iridectomy could be made peripherally in the iris. It was soon noticed that occasionally the glaucoma seemed better after the eserine so that the surgery was no longer needed. Graefe also suggested that a visual field examination could, and should be done in the office (Graefe's Archiv 2:258, 1856). Towards the end of the 19th century glaucoma was considered to be identical to elevated intraocular pressure (and vice versa). "Low-tension glaucoma" by definition, did not exist. The English language glaucoma expert was Priestley Smith.

Elliot, Robert Henry (1864-1936). *Treatise on Glaucoma.* 1922, **Henry Frowde and Hodder & Stoughton, London, (Paul B. Hoeber in New York).** Major Elliot, working at the Government Ophthalmic Hospital in Madras, India, began in 1909 to use a trephine to make a very anterior sclerectomy under a conjunctival flap, coupled with a peripheral iridectomy, in the hope of improving on the operation of Félix Lagrange (Bordeaux), and when he reported 50 cases in 1909 he didn't know that Freeland Fergus (Glasgow) and Søren Holth (Christiania) had just reported something similar. His book on "Sclero-corneal Trephining" appeared in 1913 after 900 cases and the procedure received worldwide publicity. Elliot took part in a glaucoma discussion with Priestley Smith and Lagrange at the International Congress of Medicine in London. He then made a trip to America visiting many ophthalmic centers and doing his operation 135 more times. Elliot's trephining procedure was a lot more effective in treating chronic glaucoma than an iridectomy, so, with such a vigorous send off it is not surprising that his trephining procedure took it's place beside Holth's iridencleisis as one of the most popular glaucoma operations for the next 40 years. Elliot's first book was Sclero-corneal Trephining in the Operative Treatment of Glaucoma, 1913, George Pulman & Sons,

London. (Second edition, 1914, Geo Pulman, London and Paul B. Hoeber, New York). This book made him famous and he followed up with annual summaries on progress in glaucoma in the Ophthalmic Yearbooks of 1913 to 1916, a short book called "Glaucoma, a Handbook for the General Practitioner" 1917, H.K. Lewis, London; and in 1918, "Glaucoma; A Textbook for the Student of Ophthalmology", H.K. Lewis, London, (Paul B. Hoeber in New York). It was the enlarged second edition of this book, (published in 1922 and called Treatise on Glaucoma, Henry Frowde and Hodder & Stoughton, London, and Paul B. Hoeber in New York) that did a major service to ophthalmology by improving the quality of teaching about glaucoma, and by posing some questions about the mechanisms of the disease process.

Iridencleisis was dropped for fear of sympathetic ophthalmia, and the post-operative complications of cyclodialysis made it fall from favor. Variations of Elliot's trephination are still in use: Scheie's thermal sclerectomy was popular for a while, and Cairns' 1968 trabeculectomy turned out to be another external filtering operation that worked quite well.

Uribe-Troncoso, Manuel (1869-1959). A *Treatise on Gonioscopy*. Philadelphia, F.A.Davis, 1947. Gonioscopy had a long history before 1947, but this book brought the test into the ophthalmologist's office. For a review of the history of gonioscopy (Trantas, Salzmann, Koeppe, Barkan) see Dellaporta, Survey Ophthalmology 20: 137-149, 1975. Uribe-Troncoso's 1947 book was the first comprehensive book on gonioscopy. Trantas' word 'gonioscopy' was in the title and was used throughout the book. Color paintings by Gus Bethke were the best then available. The anatomic landmarks of the chamber angle as seen with the gonioscope were named and clarified in this book. Examination of the chamber angle now had a familiar name, familiar landmarks and there were clinical indications for its use in the ophthalmologist's office, but it was still an awkward procedure: the patient was lying down, and a large, bulbous, limbus to limbus Koeppe lens was used to view the angle directly. The internal curvature of the lens vaulted over the cornea and this space had to be filled with water. The lens was then pressed to the patient's eye while the patient was turned on his back so that a suspended microscope and illuminator could be brought up for viewing. The water would often leak out, allowing air to bubble up and spoil the view. Nevertheless Troncoso's book marked the elevation of gonioscopy to an important clinical test, in part because Sugar, Gradle and Kronfeld were verifying the value of Barkan's classification of the glaucomas by the appearance of the chamber angle.

Goldmann's major contribution to gonioscopy was the Haag-Streit 900 slit lamp. This was an instrument in which the microscope and the light beam and the attached camera were always in focus together no matter what angle separated them, because they all moved together when the joy stick was moved. The joy-stick could be operated with one hand, leaving the other free to hold Goldmann's mirrored lens against the eye.

Sugar, H. Saul (1912-1993). *The Glaucomas*. New York, Hoeber-Harper, 1951 (2nd edition 1957). Dr. Sugar was a thoughtful ophthalmologist who made many contributions to the literature, including some of the early work on pigmentary glaucoma.

He was in private practice in Detroit and, in addition to being the Head of the Department of Ophthalmology at Detroit's Sinai Hospital, he was a professor at Wayne State University Medical School, and head of the glaucoma service there. His 1951 book was the first American textbook on Glaucoma and it was based largely on his own considerable experience and knowledge. He was interested in gonioscopy (see Sugar's chapter in vol. 2 of Berliner's 1949 Biomicroscopy text). Gonioscopy was used by Barkan not only for surgical goniotomy but also to differentiate one kind of glaucoma from another (note Sugar's use of the plural in his title). This text encouraged many others to tackle some of the unsolved problems in the glaucomas.

Becker, Bernard & Shaffer, Robert N. *Diagnosis and Therapy of the Glaucomas*. St Louis, C.V. Mosby, Through seven there have been many co-authors and editors including Kolker, A.; Hetherington, J. Jr.; Hoskins, H. D.; Stamper, R.; Lieberman, M.; Drake, M and Kass, M). Dr. Becker was Chairman of the Department of Ophthalmology at Washington University in St. Louis for 35 years (1953-88), he established a glaucoma research center, and was the founding editor of "Investigative Ophthalmology". His brilliance and erudition are legendary. He was an enthusiastic collector of old ophthalmic books and eventually gave his entire collection to the Medical Library at Washington University. His energetic fund raising for that library resulted in it being named "The Bernard Becker Medical Library".

Dr Shaffer was active in California for most of his clinical years. He produced a stereo atlas of gonioscopy and was a leading expert in gonioscopic surgery in infants. He also did work on malignant glaucoma and the vitreous diversion syndrome, and served for many years as the Executive Director of the American Board of Ophthalmology.

This text, designed for students of ophthalmology, was very clear and definite about the mechanisms at work in glaucoma and what should be done about it. It began in 1961 with the goal of making available the current thinking about pathogenesis, diagnosis, and management of the glaucomas in a single volume, and it did it remarkably well. If it can be said that "Lectures on

Glaucoma" by Chandler and Grant was the definitive glaucoma textbook on the East Coast, especially in New England, then Becker and Shaffer's book was certainly the glaucoma bible of the West Coast. Different treatments were recommended, and they even used opposite numbering systems for openness of the angle. These differences have softened as the new editors have worked on the text and brought diverse backgrounds to the work. The importance of pressure elevation with steroid administration was stressed, and impressive efforts have been made in later editions to keep the therapy up to date.

Ascher, Karl W. *The Aqueous Veins.*

Springfield, Charles C. Thomas, 1961. Dr. Ascher was originally from Prague where he had a special interest in keratoplasty. Because of the war he came to the US in 1939 and worked at the University of Cincinnati College of Medicine with Derrick Vail. Having studied with Alfred Vogt, Ascher was an expert with the slit lamp and detected and recognized the importance of aqueous veins. These are transparent vessels which transport aqueous from Schlemm's canal into the conjunctival or episcleral veins. This discovery settled three debates that were active at the time. First whether the aqueous fluid was a stagnant system, second whether primary open angle glaucoma was a problem of retention or of over-production of fluid, and third whether Schlemm's canal was normally a non-functioning space, which was only active in glaucomatous conditions with raised intraocular pressure. The working out of these questions also helped lead to the popularity of tonography in the middle part of the century.

Chandler, Paul A. & Grant, W. Morton.

Lectures on Glaucoma. **Philadelphia, Lea & Febiger, 1965** (2nd edition, 1968; 3rd edition 1986. A fourth edition 1996 was made available as "Chandler and Grant's Glaucoma" edited by David Epstein, Rand Allingham, and Joel Schuman.)

Chandler and Grant worked at the Massachusetts Eye and Ear Infirmary and gave a series of clinical lectures on glaucoma there. These lectures were primarily to "provide a practical guide for recognition and modern treatment of the various forms of

glaucoma and for the solution of problems encountered clinically." They brought these lectures together for publication, deliberately avoiding the research aspects of glaucoma and the details of surgical techniques. For years this book was carefully studied and mined sentence by sentence for its nuggets of clinical wisdom. It has grown and broadened in the last generation, surgical teaching has been included and many new ideas have been introduced. It is still a clinician's guide but it has become far more than a set of Boston lectures.

Shields, M. Bruce,(1941-). *Textbook of Glaucoma.* **Baltimore, Williams and Wilkins, 1982.**

This much admired text grew along a well-trodden path: first the author put together A Study Guide for Glaucoma (Baltimore, Williams & Wilkins 1982) for his students. This was very popular so he expanded it in 1987 into a Textbook of Glaucoma, which was even more popular. This was followed by 3rd (1992) and 4th (1998) editions, with contributions by other authors. Great care was taken to keep the book up to date: for example, sections on nerve thickness and the modulation of wound healing were expanded. Dr. Shields was professor of ophthalmology and director of the glaucoma service at Duke University when this work was done.

Anderson, Douglas R., (1938-). *Testing the Field of Vision.* **St Louis, C.V. Mosby, 1982.**

This was the first of an important series of books about visual field testing. The second book (1987) was called "Perimetry with and without Automation". This grew into a 3rd book (1992) called. "Automated Static Perimetry". The 4th edition was co-authored with Patella, V. in 1999. Dr. Anderson is a professor of ophthalmology at the Bascom Palmer Eye Institute in Miami. He directs the glaucoma service, so it is natural that his books emphasize glaucomatous field loss rather than defects of neurologic origin. The general shift from kinetic perimetry to automated static perimetry can be seen in this series of books. This in turn is a reflection of the success of the Humphrey Visual Field Analyser with its various new models, strategies and programs for getting the most accurate representation of the visual field.

These new programs require a text such as Anderson and Patella's to explain how best to do and interpret the fields. It was at first hoped that automated visual field testing would provide a purely objective result. But it soon became obvious that without supervision and encouragement by an experienced perimetrist the test could turn out entirely untrustworthy results. The book faces up to this problem and offers an excellent guide for the perimetrist on how to oversee the testing moment by moment, how to change the strategy as needed and how to explain to the patient the purpose and technique of the testing to get the best results.

Alward, Wallace L. *Color Atlas of Gonioscopy.* **Wolfe Publishing, Mosby-Yearbook, 1994.** This book, illustrated by Lee Allen, is not a glaucoma text, it is a slim guide to gonioscopy for the fledgling ophthalmologist. In the early

1940s Lee Allen, in Iowa City, made a direct gonioscope so light in weight that it could be held on the cornea by the eyelids and capillary attraction alone. An improved version was equipped with an internally reflecting surface built into the plastic; this gonioscope was held against the cornea and manipulated with a thumb guide. The patient could then be seated and examined at a slit lamp. The Allen-Thorpe version was provided with 4 mirrors so it didn't have to be rotated all the way around. However after only a decade or so of use this handy gonioscope was replaced by Goldmann's lens. Lee Allen's drawings of the chamber angle using his gonioscope, made in the late 1940s and early 1950s are outstanding, and remain unsurpassed in clarity. Their publication here in Alward's instructional book is a winning combination that is much prized as a teaching tool.

Neuro-ophthalmology

Wilbrand, Hermann and Saenger, Alfred. *Die Neurologie des Auges: ein Handbuch für Nerven- und Augen-ärzte.* **Wiesbaden, J.F. Bergmann, 1900-1922.** Having done chapters for other texts, in 1899 Wilbrand started on his own work, in collaboration with Alfred Saenger. It was called "The Neurology of the Eye: a handbook for neurologists and ophthalmologists". There were to be nine volumes in the set, and they were published over a considerable period of time and were not completed until 1922. These volumes offered a detailed summary of the contributions to German neuro-ophthalmology over the last half of the 19th century. This exhaustive set, together with the endless Graefe-Saemisch (neither of them ever translated into English) were the origin of the statement that "The 'Laurels of Originality' often celebrate nothing more than an ignorance of the old German literature."

Posey, William Campbell and Spiller, William G. *The Eye and Nervous System, their diagnostic relations by various authors.* **Philadelphia, J.P. Lippincott, 1906** When William Thomson retired from his clinic at the Wills Eye Hospital in January 1902, he was succeeded in June by William Campbell

Posey, a man who had an even stronger interest in the neurological problems of vision. Posey collaborated with William Gibson Spiller, the neurologist at the Pennsylvania Hospital, who had spent four years in Europe training with Oppenheim, Obersteiner, Edinger, Déjerine and Gowers. In 1906 they produced a fat, multi-authored textbook called "The Eye and Nervous System". There were 100 pages on eye movements by Alexander Duane, 40 pages on the 5th, 7th and sympathetic nerves by Edward Jackson, and 80 pages on neuroses and psychoses by DeSchweinitz. This single volume was Philadelphia's answer to what Wilbrand and Saenger were doing. 'Posey and Spiller' was America's first text devoted exclusively to the subject matter now called Neuro-ophthalmology. For a generation this book was the best one volume text on the neurology of vision.

Inouye, Tatsuji (1880-1976). *Die Sehstörungen bei Schussverletzungen der kortikalen Sehsphäre, nach Beobachtungen an Verwundeten der letzten japanischen Kriege.* **Leipzig, W. Engelmann, 1909** (An English translation of this work is available through the journal *Brain*)

The anatomists of the late 19th century had identified the visual pathways in the brain all the way to the occipital cortex, (see Polyak's masterful review: especially Chaps. 4 & 12 of *The Vertebrate Visual System*, Univ Chicago Press, 1957) and Wilbrand and then Henschen had laid out the expected visual field loss associated with various cerebral lesions. A few focal injuries to the brain were needed to confirm the facts in humans. During and after Japan's war with Russia (1904-1905), Inouye was able to test the visual fields in wounded soldiers for insurance purposes and realized the importance of his observations. A few years later, during World War I the London neurologist Gordon Holmes, examining soldiers with shrapnel injuries to the brain, began to sort out the exact representation of the retina in the visual pathways and cortex (Brain, 1916, 39:34; BJO, 1918, 2:353). On the German side Wilhelm Uthoff was making similar observations; he may have had fewer occipital injuries to work with because of the shape of the German helmet. For 75 years Holmes' map was the best available. In 1991 Horton and Hoyt (Arch Ophth. 109: 816-824) were able to make a small improvement on Holmes' map of the representation of the visual field in the human occipital cortex.

Traquair, Harry Moss (1876-1954). *An Introduction to Clinical Perimetry.* London, **Henry Kimpton 1927.** (St Louis, C V Mosby,) (6th ed. 1949).

In the first quarter of the century, the tangent screen, as recommended by Bjerrum and Rönne in Copenhagen, and picked up by A.H.H.Sinclair of Edinburgh (TOSUK, 1905) was being popularized in America by Alexander Duane, Harry Friedenwald and Luther C. Peter, and it was beginning to replace the arc perimeter. Traquair of Edinburgh, Scotland took a special interest in tangent screen campimetry, and in 1927 produced a book called "An Introduction to Clinical Perimetry" that he personally carried through six editions. The 7th was done in 1957 by Traquair's student G.I. Scott. Traquair's book, in which he introduced the concept of "the Island of Vision", was the standard perimetry text throughout the world until edged out by David O. Harrington's text book "Visual Fields" in the late 1950s.

Cogan, David G. *The Neurology of the Ocular Muscles.* **Springfield, Charles C. Thomas, 1945** (published simultaneously in UK by Blackwell, Oxford, and in Canada by the Ryerson Press, Toronto). Cogan's small but fully referenced book was written in a very economical style so that one could pick up several important points in a single paragraph. Many of the brainstem syndromes that disturbed eye movements mentioned by Bielschowsky were brought into sharper focus. No better description of the cranial nerves serving the eye muscles could be found.

Walsh, Frank Burton (1895-1978) *Clinical Neuro-ophthalmology* **Baltimore, Williams & Wilkins, 1947.**

Walsh was a Canadian from Saskatchewan who had served in World War I. He received his medical degree from the University of Manitoba in 1921, interned in Winnipeg, and began to practice general medicine. After seven years he decided he wanted to specialize and began a residency at Johns Hopkins in 1930 with Dr Wilmer as his chief. Walsh was particularly influenced by Frank Ford, the pediatric neurologist, who was working on a book called "Diseases of the Nervous System in Infancy, Childhood and Adolescence" (Springfield, Charles C. Thomas 1937). Walsh's 1947 book, "Clinical Neuro-ophthalmology", was so impressive and so popular that he soon started working on the second edition and this came out in 1957; it had three columns instead of two and was altogether a very impressive compendium of neuro-ophthalmic knowledge. The third edition was the product of a collaboration between Dr Walsh and his 1958 fellow William F. Hoyt of San Francisco. It appeared in 1969. The fourth edition of "Walsh and Hoyt" came out in the 80's revised and greatly enlarged by Neil Miller, Walsh's successor at the Wilmer Institute. For the fifth edition of "Walsh & Hoyt", Miller and his co-editor Nancy Newman solicited chapters from many neuro-ophthalmologists. The dramatic increase in the size of this book through its five editions is an indicator of the geometric expansion of neuro-ophthalmic knowledge in the 2nd half of the 20th century.

Bender, Morris B. *The Oculomotor System*. NY, **Hoerber, 1964**. In 1961 Dr. Bender put together a symposium on eye movement control at the Mt Sinai Hospital Department of Neurology in New York, and this book was the result. The symposium attracted investigators from all over the world, and since that time, these workers and their successors have met repeatedly to compare notes, (see the work of Daroff, Dell'Osso, Robinson, Leigh, Zee, Baloh, Sharpe, Halmagyi, Paige and others). This has led to significant new understanding of eye movement control.

Hoyt, William Fletcher & Beeston, Diane. *The Ocular Fundus in Neurologic Disease: a diagnostic manual and stereo atlas*. St Louis, CV Mosby, **1966**. In the 1870s and 1880s many voices had strongly urged that the ophthalmoscope be used by all physicians to examine the retina and the optic nerve head (see especially Eduard Jaeger, Hughlings Jackson, Clifford Allbutt, and William Gowers). This book, by a neuro-ophthalmologist (Hoyt) and a photographer (Beeston), follows in the same tradition. There are 14 viewmaster reels and a fold-up viewer at the back. The book sold out almost immediately and was never reprinted. A generation of neuro-ophthalmologists used this book, if they could find a copy, to teach a generation of ophthalmologists about the differential diagnosis of the elevated optic nerve head.

Smith, J. Lawton & Glaser, Joel S. *Neuro-ophthalmology – University of Miami Symposia*, Vol 1. **Springfield, Charles Thomas, 1964**. Vols 2-4, 6-10. St Louis, C.V Mosby, 1965-1980. Vol 5. Hallandale FL, Huffman, 1971. These were the years of spectacular growth of the subspecialty of neuro-ophthalmology, and Lawton Smith was a major player: he was guru, enthusiast, teacher, catalyst and salesman. In the mid 1960s his “Miami Symposium” was the only annual meeting for neuro-ophthalm-ologists. In this series of ten books Smith and Glaser manage to convey the

bubbling and uneven quality of the new subspecialty, and the excitement of learning something new every day. It was this sense of immediacy that Smith later transferred to his role as founding editor of the Journal of Clinical Neuro-ophthalmology.

Leigh, John & Zee, David S. *The Neurology of Eye Movement*. Philadelphia, F.A. Davis Co, **1983**, 281 pp. (2nd edition, 561 pp, 1991; 3rd edition, 646 pp. 1999). These two clinicians wrote their book for ophthalmologists, neurologists and neurosurgeons who in turn continue to find it of value in recognizing and understanding clinical problems. The peg-board upon which various eye movement abnormalities have been hung up and sorted out is that of control systems analysis and modeling as recommended by the neurophysiologist David A. Robinson. This technique has helped to answer many difficult questions about the pathophysiology of human eye movements.

Loewenfeld, Irene E. *The Pupil: Anatomy, Physiology and Clinical Applications*. Ames, **Iowa State University Press, 1993**, 2223 pages, (2nd printing Butterworth & Heinemann, 1999). Otto Löwenstein (1890 -1965) was professor of Neuropsychiatry at University of Bonn from 1933-38. He was interested in pupillary movements and eventually settled in New York where he practiced medicine and continued his efforts to record and understand pupillary movements. In 1940 Irene Loewenfeld began to work in Löwenstein's lab at NYU (and later at Columbia) first as a technician, then as a graduate student, and eventually as a collaborator in pupillary research. Together they made many important contributions to pupillary physiology over the next decades. In 1993, Loewenfeld completed this thorough and important book on the workings of the pupil of the eye starting with and building upon Löwenstein's contributions. (See review in Amer. J. Ophthal. 116:117-119, 1993)

Optics and Refraction

Although spectacles had been invented in the 13th Century, and were common as reading aids ever since the eye had been recognized in the early 17th century to be an optical device, a real understanding of how to measure a patient's eye for glasses only came in the 19th century. The standardized vision chart with 20/20 notation was proposed by Snellen in 1862; Donders clarified the scientific basis of refraction in 1864, and in 1876 Nagel suggested the "diopter" as a standard unit of lens power. In the first years of the 20th century some ophthalmologists were doing very careful refractions, trying to incorporate cylindrical power into spectacles after estimating corneal astigmatism with Javal's keratometer, and refining the refraction with and without atropinic eye drops. This was in contrast to the rough estimates that went into the dispensing of most glasses.

Jackson, Edward. *Skiascopy and its practical application.* Philadelphia, The Edwards & Docker Co. 1895. This book was a deliberate (and successful) effort to popularize the test that had been called "the shadow test" (Cuignet, 1875) and is now called "retinoscopy" (Thorington, 1897). The book was frequently reprinted in the first decades of the century. This technique used the doctor's observations rather than the patient's responses and it became an almost universal first step in estimating refractive error. Jackson encouraged full correction of ametropia. In 1887 Jackson had recommended a cross cylinder for estimating cylinder strength and only later did he realize how quickly and effectively the cross cylinder could be used to determine cylinder axis. In 1907 at the Colorado Ophthalmological Society, Jackson began to give instruction on the use of the cross cylinder, a handy test that made it possible, in the course of a simple examination, to measure the power and the axis of the total astigmatism both corneal and lenticular. In some clinics automated refractometers are beginning to replace retinoscopy as a way to find a starting place for a refraction.

Gullstrand, Allvar, (1862-1930). *Allgemeine Theorie der monochromatischen Aberrationen und ihre nächsten Ergebnisse für die Ophthalmologie.* Upsala, Berling, 1900. (General theory of mono-chromatic aberrations and its direct results for ophthalmology). This book introduced Gullstrand's work in optics to ophthalmology and helped establish him as the 20th century's worthy successor to Helmholtz. Gullstrand was Professor of Ophthalmology at the University of Upsala

from 1894 until 1914. During this time he was an active surgical ophthalmologist and teacher. In 1914 a special post of Professor of Optics was created for him there, so that he could pursue his primary interest in physiological optics. He is known for his work on the third edition of Helmholtz's "Treatise on Physiological Optics" published 1909-1911 and translated into English in 1924. In this work Gullstrand edited and annotated the work of Helmholtz with a pious respect for the original text. He then added a series of lengthy appendices of his own work, which brought the area of optics up to date especially in regard to the field of ophthalmology. He confirmed Helmholtz's ideas about the mechanism of accommodation by describing the intracapsular lens changes, and he showed how the shape of the cornea could be mapped with reflections. At the turn of the century unwanted reflections were troublesome in the examination of the fundus. Gullstrand worked first on the theoretic aspects of the problem, and then produced a working, stand-mounted reflex-free ophthalmoscope.

Gullstrand introduced aspheric lenses to ophthalmology. Even more importantly he developed a slit beam for lateral illumination, leading the way to the Zeiss slit lamp. His contributions in the area of dioptrics led to a Nobel Prize in 1911. Gullstrand's original work is still under-appreciated by most English speaking ophthalmologists, perhaps because of the complex geometric formulas used in his German texts. His influence on 20th century ophthalmology was immense, and it can be seen today in the optics of the slit lamps that are now casually used in every eye examination.

Obrig, Theo. E., A.B. *Contact Lenses. Philadelphia, Chilton, 1942.* This book records the history of a hundred years of attempts to fit a lens in direct contact with the eye. Obrig did pioneering work with plastic "scleral contact lenses". He made a cast of the front of the globe, as others had done, and then molded a plastic shell to conform to the shape of cornea and sclera. Refraction was repeated over the shell, and zones of poor scleral fit were marked on the shell. The lens was then sent away to have the optics installed and the shell modified for a uniform tight fit. The technique was tricky and the lens uncomfortable, but it actually worked and was used for special circumstances.

Mandell, Robert. *Contact Lens Practice. Springfield, Charles C. Thomas 1965.* (Fourth edition 1988). Dr. Mandell was active as a professor at the University of California, College of Optometry, Berkeley while these books were coming out. Dr. Mandell was very influential in establishing fitting patterns for hard corneal contact lenses that were easy on the cornea. The trend at first was to fit the lens to the flattest axis of the cornea, and this led to chronic epithelial stippling and a tendency for the lens to flip out with a firm blink. This accounted for the peculiar head back posture

of early contact lens wearers. In his book Mandell emphasized the need for a vaulted lens and proper centering, always with consideration for the oxygen needs and health of the corneal epithelium. As the wide variety of soft contacts and then rigid gas permeable lens became available, Mandell kept pace and provided fitting guides with illustrations in the later editions.

Bifocal contact lenses were tried, and some patient's were happy to have one eye corrected for distance vision leaving the other eye focused for reading. This was referred to as "monovision".

Milder, Benjamin & Rubin, Melvin L. *The Fine Art of Prescribing Glasses Without Making a Spectacle of Yourself. Gainesville, Triad Scientific Publications, 1979.* Refraction is all too often taught to residents by bored junior instructors who only manage to convey their unhappiness with the job. Milder and Rubin accepted the serious challenge of teaching an important subject to reluctant would-be ophthalmologists, and they have succeeded brilliantly, and produced this smoothly written and light-hearted book. An enlarged second edition appeared in 1991, and it is still heavily used by ophthalmology residents.

Pediatric Ophthalmology

Maddox, Ernest Edmund (1863-1933). *Tests and Studies of the Ocular Muscles. Bristol, John Wright, 1898.* This book reviewed the details and summarized the examination of the alignment of the eyes. It started with a little book called *The Clinical Use of Prisms and the Decentering of Lenses*, 1889, which was revised and enlarged in a second edition in 1893 when Maddox was 30 years old. In the first quarter of the 20th century ophthalmologists everywhere had learned to use his tools and devices to estimate and measure ocular deviations: the Maddox Rod, the Maddox Wing, the Maddox Double Prism.

Worth, Claud Alley (1869-1936). *Squint, its Causes, Pathology and Treatment. London, John Bale and Danielsson, 1903* (and in U.S., Philadelphia, P. Blakiston's Son & Co, 1903).

During the next 25 years Worth supervised six editions of his summary of his experience with comitant strabismus. (3rd edition, Bale Sons and Danielsson, 1906; 5th edition, London, Baillièrè, Tindall & Cox. 1921) After Worth's death in 1936, a "7th edition" was produced in 1939, called *Worth's Squint; or, The binocular reflexes and the treatment of strabismus*. This was a new book, written entirely by Francis Bernard Chavasse. (Those who have referred to this book as "Worthless" have sacrificed the truth for a pun). Chavasse died in 1941, and an "8th edition" (London, Baillièrè, Tindall & Cox) appeared in 1950 called *Worth & Chavasse's Squint: the binocular reflexes and the treatment of strabismus*. This was a complete re-doing by Keith Lyle of Chavasse's "Worth's Squint" (Lyle was born in the year of Worth's first edition). A 9th ed. by T.

Keith Lyle and G.J.O. Bridgeman appeared in 1959.

What was it about Claud Worth that made the publishers cling to his name 33 years after his death? Worth was born into a well-to-do English farming family, and quite against his father's wishes, developed a passion for sailing that stuck with him all his life. He is now perhaps better known to sailing enthusiasts than to ophthalmologists ("Worth's chain pawl"; *"Yacht Cruising"*, 1910; *"Yacht Navigation"*, 1927).

After training in ophthalmology he was able to concentrate on one area - strabismus - and he developed an unusual expertise. He started the first Orthoptic Clinic at Moorfields and set about systematically examining children with comitant squint and recording every detail. He invented the amblyoscope and began trying to train the fusion sense in children. His book was based on 2337 such cases seen between 1893 and 1903. This kind of monograph may not seem unusual today, but at the turn of the century it was sensational, "a beautiful demonstration of the value of that somewhat rare gift - the capacity for undertaking, with sustained interest, laborious and honest observation in the elucidation of clinical problems." (Duke-Elder)

Howe, Lucien (1848-1928). *The Muscles of the Eye*. New York, G.P. Putnam's Sons, 2 volumes, 1907-1908.

Dr Howe was a prominent American ophthalmologist who attended many European meetings. In 1884, at age 36 he wrote to the American Journal of Ophthalmology from Heidelberg about the demonstration he had just witnessed of the use of a cocaine solution as a local anesthetic. At 40 he agitated for control of ophthalmia neonatorum by placing prophylactic drops in the eyes of every newborn, and was instrumental in getting "The Howe Bill" through the New York legislature in 1890. At 60 he published his *magnum opus* -an influential 2 volume text on ocular motility that was 900 pages long, with 2000 references and 356 in-text figures and various appendices and indices. It was clearly the most thorough book on the subject in English, and it was much admired and was dubbed "a classic" even before the second volume was available.

He lived another 20 years and did some important philanthropy.

Peter, Luther C., (1869-1942). *The Extra-ocular Muscles; a clinical study of normal and abnormal ocular motility*. Philadelphia : Lea & Febiger, 1927, 294 pages. (2nd edition, 1936, 351 pages. 3rd edition 1941, 368 pages). Luther Peter, at the University of Pennsylvania, who had written a very successful book on perimetry in 4 editions (1916-1938), put out this book on eye movement problems, using the same publisher, and it served a generation of American students of ophthalmology. Taken together the three editions provide a fascinating review of "pre-Scobee orthoptics", and of the parade of ingenious instruments and devices offered for the diagnosis and treatment of eye movement problems.

Bielschowsky, Alfred (1871-1940). *Lectures on Motor Anomalies*. Hanover, Dartmouth College Publications, 1940. softcover, 128pp.

Bielschowsky was a well established German professor of Ophthalmology, who in 1935 accepted an invitation from Adelbert Ames to join the Dartmouth Eye Institute. He practiced there for five years and lectured widely on eye movements. These lectures were given at the Research Study Club of Los Angeles in 1938, and were then published in the American Journal of Ophthalmology (1938-39). They were to be part of a major textbook in English on this subject, but he died suddenly on Jan 5th 1940 on a trip to Manhattan and was buried in Hanover, NH.

Scobee, Richard G. (1914-1952). *The Oculorotary Muscles*. St Louis, C. V. Mosby, 1947. Scobee was an energetic and cheerful young man at Washington University in St Louis with a passionate interest in straightening children's eyes. ("Strabismus is not only my work, it is my hobby" he said). In a decade he wrote 70 papers on the topic. He summarized what he was learning in this book and it had an energizing effect on the new subspecialty of pediatric ophthalmology and on orthoptic training. His tragic death at age 38 was from coronary artery disease. All who knew him seem to remember him with warmth and admiration.

Burian, Hermann (1906-1974) and **von Noorden, Gunther K.** (1928-). *Binocular Vision and Ocular Motility*. **St Louis, C.V. Mosby, 1974**, (fifth edition 1996). Dr. Burian worked in Goldmann's lab in Berne and with Tschermak in Prague before joining Bielschowsky at the Dartmouth Eye Institute in 1935. At the close of the Institute in 1945, Burian practiced in Boston and then went to Iowa City in 1951, where he was active in ocular motility research and practice and in electrophysiology. He died in 1974 just before the book came out.

Dr. von Noorden did his medical training in Germany and his ophthalmology training in Iowa while Burian was there, and he remained

on the Iowa faculty for a year before moving to the Wilmer Institute. He has been active at Baylor in Houston, emphasizing strabismus and amblyopia.

Burian wrote the chapters in the book on physiology, perception, examination, and neuromuscular control, while von Noorden emphasized the clinical aspects of eye deviation and therapy. The revising and updating for subsequent editions, have been done by von Noorden alone. This book encourages the reader to want to understand the mechanisms at work in ocular motility. The authors set out to explain these things thoughtfully, with the practicing ophthalmologist in mind, and with language that is crisp and clear.

Hereditary Ocular Diseases

Ishihara, Shinobu (1879-1963). *Test for Colour-Blindness*. **Tokyo, Handaya Company, 1917**. Ishihara attended medical school at Tokyo University with a military scholarship and an obligation to serve in the Army upon graduation in 1905. He then studied Ophthalmology at Tokyo University under Prof. J. Komoto. He went to Germany in 1912 and learned more ophthalmology with Prof. W. Stock in Jena. When the war began in 1914 he returned home to Tokyo and worked as an instructor in the Military Medical School. During this time he was asked to devise a test to screen recruits for abnormalities of color vision. His adjutant (also a physician) was color blind and helped by testing the test plates. At first the charts were not for sale and were used exclusively by the Army. Some of these first plates used the cursive Japanese phonetic script ('hiragana') and some asked the subject to trace a tortuous line across the plate.

In May 1916, Ishihara received his Doctor of Medical Sciences from Tokyo University (Thesis: "The Cause of Idiopathic Night-Blindness and Conjunctivitis Sicca"). Later that same year he made a set of plates using the 'kanji'-based Japanese phonetic script ('katakana'). He personally painted all the dots for his charts with watercolors. His contribution was in designing new plates that used several different stratagems to bring out anomalies in color vision. The original hand-

painted charts are still at the University of Tokyo.

Ishihara was not the first to use pseudo-isochromatic plates; Jakob Stilling had published a set of 8 such plates in 1877 and 1883. Oguchi and then Fuminori Ita had produced some color charts in Japan in 1913. Ishihara's plates were evidently superior: they seemed to give better results and were easier to interpret. In 1917 he first considered that the plates might be valuable elsewhere in the world and made a set of charts using Arabic numerals, which he called the "International Edition", but he could find no one to publish the plates. Finally, in late 1917, he had 600 copies printed by the Handaya Company at his own expense with instructions in English. The title was "Test for Colour-Blindness", and very few copies were sold.

In 1921 Ishihara sent 90 copies off to Universities and ophthalmologists around the world. In 1923 Meisling evaluated the plates and gave them his enthusiastic support and, as a result, the International Edition was accepted as the preferred color vision test for seamen and railroad employees in Scandinavia. This created a new demand for the booklet and, in 1925, the Kanehara Co. took up the job of marketing and distributing the International Edition (*Ishihara Pseudoisochromatic Charts for Color Blindness*, Tokyo, Kanehara & Co, 1925). This was referred to as the 5th edition; the previous 4

having come from Handaya Co. Both companies still exist and have kept to their agreement for 75 years: Handaya handles the Japanese versions and Kanehara the overseas versions.

At the 13th International Congress of Ophthalmology at Amsterdam/The Hague in 1929 the plates were recommended for testing naval personnel and air force pilots. Ishihara's charts were then used throughout the world for many decades and they are still considered the best screening test for congenital color blindness.

In 1922 Ishihara succeeded Professor Komoto as Chair of Ophthalmology. In 1937 he served as Dean of the Faculty of Medicine. In 1940 he retired and became professor emeritus. In 1925 Prof. Ishihara wrote a textbook called "Concise Ophthalmology" which was exceedingly popular in Japan and went through 22 editions. He donated the royalties from his color vision test to establish a foundation that still provides research grants for color vision studies. In 1963 the Japanese Government named him as a National Treasure.

Waardenburg, P.J., (1886-1979). *Das menschlichen Auge und seine Erbanlagen*. **'s-Gravenhage, Martinus Nijhoff, 1932**. This text (The Human Eye and its Genetic Disorders) stirred up a European interest in the subject, so that in the 1930s Waardenburg in Leyden, François in Ghent, and Francheschetti in Geneva were independently collecting information about familial eye disease, but this work was all delayed by the war. After the war, Waardenburg collaborated with Franceschetti and Klein to produce "Genetics in Ophthalmology" (Royal Van Gorcum, The Netherlands, 1961)

François, Jules (1907-1984). *L'Hérédité en Ophtalmologie*. **Société Française d'Ophtalmologie, 1958, Masson & Cie. Paris**. (An English translation supervised by Mr Frank W. Law, appeared in 1961, C.V. Mosby, St Louis). In 1959 François followed up with another French Ophthalmology Society volume called *Les Cataractes Congénitales*.

These books led to further important collaborations.

Franceschetti, Adolphe, (1896-1968). **François, J. and Babel, J.** *Les Hérédo-dégénéresences Chorio-rétiniennes*. **Société Française d'Ophtalmologie, 1963, Masson, Paris**. An English translation, *Chorioretinal Heredodegenerations*, was published by Charles C. Thomas, Springfield, Illinois in 1974. These three postwar publications in Belgium, The Netherlands and Switzerland were full of case histories and family trees and they added greatly to the understanding of the heredity of eye diseases, at a time when Watson and Crick had just cracked open the door that would eventually lead to molecular biology in genetics. No doubt, when the human genome is fully mapped there will be extensive re-classifying of many of these conditions.

Krill, Alex E. (1928-1972). *Hereditary Retinal and Choroidal Diseases Vol 1. Evaluation, Vol 2, (Krill & Archer) Clinical Characteristics*. **New York, Harper & Row, 1972**. Krill was a professor of ophthalmology at the University of Chicago, Pritzker School of Medicine and editor of "Ophthalmology Digest". His main research interest was in the influence of the retinal pigment epithelium in chorio-retinal disease. He studied this through genetics, fluorescein angiography, and electrophysiology. This knowledge helped him with the taxonomy of retinal diseases; he was able to step past the renaming of diseases based on reports of certain familial occurrences, and try to categorize them by fluorescein appearance and by function. The first volume summarizes the tests then available to help sort out different chorio-retinal diseases. Volume two was incomplete at the time of his death in an airplane crash. Drs. Archer, Deutman, and Newell and many other contributors worked together to complete Krill's book – a book that seemed to bring some functional order to a group of uncommon and hard to grasp diseases. August F. Deutman's "The hereditary dystrophies of the posterior pole of the eye" (Assen, Van Gorcum, 1971) provided a brilliant follow up to Krill's work.

Retina and Vitreous

Ramon y Cajal, Santiago (1852-1934). *Die Retina der Wirbelthiere*. **Wiesbaden, J.F. Bergmann, 1894**. This work on the structure of the vertebrate retina was done in 1892-93, and translated into French, it first appeared in the Belgian review *La Cellule*. With Cajal's assistance, Richard Greeff then translated it into German and it was published, along with some other papers by Cajal, in 1894. This was part of the work for which Cajal earned the Nobel Prize in 1906. Then in 1933 just before his death, Cajal produced an expanded and revised edition in French. This appeared in *Travaux du Laboratoire des Recherches Biologiques de l'Université de Madrid*, 1933. These three editions were brought together and translated into English by S. Thorpe and M. Glickstein and published by Charles C. Thomas in 1972 as *The Structure of the Vertebrate Retina*. The beautifully precise drawings of silver-stained retinal neurons were in stark black and white. Nothing like them had been seen before; the cellular nature of retina and brain tissue was demonstrated, and the concept soon followed that information always entered the neuron by the dendrites and emerged via the axon. These dramatic observations led to a much better understanding of retinal elements and their interconnections.

Woods, Alan C. *Endogenous Inflammations of the Uveal Tract*. **Baltimore, Williams & Wilkins, 1956-1961**. This book was the last of a series of works by Dr. Woods during his lifelong effort to understand ocular inflammations. During the war years of 1916-1918 he wrote a series of 5 articles about Ocular Anaphylaxis. His 1933 book "Allergy and Immunology in Ophthalmology" summarized knowledge of ocular tuberculosis and the concept of ocular inflammations induced by focal infections elsewhere in the body. In 1934 when Wilmer retired, Woods became professor and Director of the Wilmer Institute. In 1956 he wrote a book called "Endogenous Uveitis" with some excellent illustrations by Annette Burgess. Then in 1960 he became persuaded that previous exposure to histoplasmosis was a contributing factor in certain macular lesions (AJO 49:205). Evidence

supporting this idea was summarized in 1961, in the second edition of "Endogenous Uveitis" (called "Endogenous Inflammations of the Uveal Tract"). Books by Ted Schlaegel of Indianapolis and Ronald Smith & Robert Nozik of California built on Dr Woods' work and addressed the subject of uveitis for the next generation of ophthalmologists.

Gonin, Jules (1870 -1935). *Le Décollement de la Rétine*. **Lausanne, Librairie Payot, 1934**. Gonin spent the entire second half of his life wrestling with the problems of retinal detachment. By 1918 he had become convinced that Theodor Leber was right when he suggested in 1882 that tiny adhesions between the vitreous gel and the adjacent retina – for the most part ophthalmoscopically invisible – could contract and tear a hole in the retina; and that the retina then became detached when fluid from the vitreous got through the hole and worked its way between the retina and the choroid. Gonin then emphasized the importance of sealing the hole. Gradually a technique was worked out that involved draining the fluid and using diathermy through the sclera to stir up a local inflammatory response in the choroid to plug the hole. This book summarizes his pioneering work on understanding and treating detachments of the retina.

Meyer-Schwickerath, G. *Lichtkoagulation*. **Stuttgart, Ferdinand Enke, 1959**, Suppl. 33, *Klin. Mbl. Augenheilk.* This monograph reviews the history of the author's pioneering work with photocoagulation of the retina, from using the sun as a source of light, then a carbon arc lamp, and finally the xenon arc lamp. It appeared in English, translated by Stephen Drance, as *Light Coagulation* St Louis, C.V. Mosby, 1960.

Schepens, Charles L. *Retinal Detachment and Allied Diseases* (2 vols). **Philadelphia, Saunders, 1983**. (2nd edition with Mary E. Hartnett and Tatuhiro Hirose. Boston, Butterworth Heinemann, 2000). Schepens mounted the indirect ophthalmoscope on the doctor's head and this made it possible to indent the sclera to see the peripheral retina,

and this helped to localize the retinal hole that was causing the detachment. The draining of the fluid could then be done in the right location and the encircling band and buckle could be made to apply pressure in the right place. Schepens and his group had a major influence on retinal detachment surgery through the entire last half of the century.

Cibis, Paul (1911-1965) *Vitreoretinal Pathology and Surgery in Retinal Detachment* **CV Mosby, St Louis, 1965.** Old retinal detachments have a way of scarring and stretching the retina and they have always been difficult to treat. In this book Dr. Cibis summarizes his work on surgically releasing pre-retinal membranes and using silicone as an artificial vitreous. Dr. Cibis died soon after the completion of this text leaving a strong family of ophthalmologists including his wife, son and daughter. His work has continued in St. Louis and for a time vitreous surgery was the most active area of advancement in clinical ophthalmology. This was largely due to Cibis's early work on "hopeless" cases of retinal detachment.

Gass, J. Donald M. *Stereoscopic Atlas of Macular Disease.* **St Louis, CV Mosby, 1970.** (2nd edition, 1977, in one volume with 951 in text illustrations and 133 stereoviews on 19 ViewMaster reels; 3rd edition 1987; 4th edition in 2 volumes, 1997) Dr. Gass spent his entire academic career as an expert on macular disease, and his name will probably still come up when macular problems are discussed at the turn of the next century. This book remains the definitive work on the subject and the color photos are of the finest quality. Each new edition has kept up with recently

recognized clinical entities and sorts out various conditions that had previously been wrongly lumped together.

Shields, Jerry. *Diagnosis and Management of Orbital Tumors.* **Philadelphia, Saunders, 1983.** 2nd edition, 1989; 3rd edition *Intraocular Tumors* rewritten and revised by Shields, J. and Shields, C. 1992; 4th edition, Lippincott-Williams and Wilkins, 1999 Dr. Jerry Shields has been the Director of the Ocular Oncology Unit at Wills Eye Hospital for some years and has enormous clinical experience, especially in uveal melanomas.

The latest edition of this text was done in collaboration with his wife, Dr. Carol Shields - also at Wills Eye Hospital - and their Oncology fellows. It is rare for one department, in one hospital to have such an active subspecialty practice, and perhaps rarer for one such unit to be able to produce a world class text for 2 decades without recruiting expertise from all over the country. Uveal melanomas and retinoblastomas get most attention, followed by phakomatoses, epithelial tumors, and lymphoid and leukemic processes in the eye. It is a worthy successor to Reese's book of the previous generation.

Ryan, Stephen J. *Retina.* **St Louis, Mosby, 1989.** With associate editors: T. Ogden, A. Schachat, R. Murphy, B. Glaser, and their 164 contributors. The 2725 illustrations were supervised by Timothy Hengst. A second edition appeared in 1994 (188 contributors, 3573 illustrations), and a third edition in 2000. This 3 volume, multi-authored work, under the general editorship of Dr Ryan was immediately recognized as an authoritative standard text for vitreo-retinal specialists.

Oculoplastic Surgery

Three generations before World War I stimulated a general interest in facial and ophthalmic plastic surgery Johann Friederich Dieffenbach (1792-1847) was working in Berlin and Friedrich August von Ammon (1799-1861) in Dresden, laying the foundations of modern plastic surgery.

Czermak, Wilhelm. *Augenärztlichen Operationen.* **2nd edition, Berlin & Wien, Urban & Schwarzenberg, Vol 1: 1907, Vol 2: 1908.** Czermak, professor at Prague from 1895, was only 50 when he died in 1906, and his

successor Anton Elschnig undertook to bring out a second enlarged edition of this important text. Volume 1 of which is devoted almost entirely to the eyelids. Czermak enlarged Krönlein's approach to the orbit.

Meller, Josef. *Ophthalmic Surgery.* Philadelphia, Blakiston's Son & Co, 1908, (translation reviewed by Walter L. Pyle). Meller was then Privatdocent at the 2nd Eye Clinic in Vienna. So many Americans had gone to this Clinic in Vienna to hear Fuchs' lectures that there was a demand for a small surgical text designed for the ophthalmologist in training. Meller's book is well laid out and the rules are made clear ("Never draw the Graefe knife backwards, don't even bring it to a standstill") and the illustrations are of exemplary clarity. A second US edition, (edited by William M. Sweet.) Philadelphia, Blakiston's Son & Co, appeared in 1913, and a 3rd US edition in 1923. Meller was now at the First Eye Clinic in Vienna as Clinical Professor. (a sixth edition, revised by Böck, who was Meller's successor as Professor at the 1st Eye Clinic, appeared in 1953)

Whitnall, Samuel Ernest. *The Anatomy of the Human Orbit and Accessory Organs of Vision.* London, Henry Froude & Hodder and Stoughton, 1921. Whitnall was an Englishman (Oxford and St Thomas') who emigrated to Canada in 1919 to become professor of Anatomy at McGill University. Whitnall carefully dissected the human orbit and described the distribution of the levator aponeurosis, the superior transverse ligament ("Whitnall's ligament") and the insertion of the lateral canthal tendon, all of which was a great help to ophthalmic plastic surgeons.

Sheehan, J. Eastman. *Plastic Surgery of the Orbit.* NY, Macmillan, 1927. Dr Sheehan was a New York facial plastic surgeon with many interests, who wrote a book about plastic surgery of the nose in 1925. This book on the orbit is handsomely put together, with many well-made drawings and photographs and is dedicated to Harold Delf Gillies the English plastic surgeon. It is "the first book devoted solely to orbital plastic surgery" (*Mustardé*)

Wheeler, John Martin. (1879-1938). *The Collected Papers of John Martin Wheeler, M.D. on Ophthalmic Subjects.* Institute of Ophthalmology, Columbia-Presbyterian Medical Center, 1939. Dr Wheeler trained in New York and served at Fort McHenry, Maryland in World War I and developed a great interest in ophthalmic plastic surgery.

He took over the directorship of the Bellevue ophthalmology service from C.H. May in 1925, and in 1928 he resigned to become the first director of the new Institute of Ophthalmology at the Presbyterian Hospital. His papers were usually on surgical subjects and they were admirably short and clearly stated. This book contains 30 papers on oculoplastic and orbital problems, many of them influential. They reveal that he was a modest man and a caring physician. His student Wendell Hughes stayed at Bellevue to found an oculoplastics service and went on to teach other well-known ophthalmic plastic surgeons, among them Alston Callahan and Byron C. Smith.

Spaeth, Edmund Benjamin. (1890-1976) *Newer Methods of Ophthalmic Plastic Surgery.* Philadelphia, P. Blakiston's Sons, 1925. This was the first book in English devoted to oculoplastic surgery. In 1939 Dr. Spaeth incorporated much of this book into a new text called *Principles and Practice of Ophthalmic Surgery* (Philadelphia, Lea & Febiger). This popular book quickly went through several editions: 2nd, 1941; 3rd 1944; 4th, 1948. Edmund Spaeth's interest in ophthalmic plastic surgery began in World War I. His large private practice in Philadelphia reflected his expertise in these problems, and for many years the residents at Wills Eye Hospital learned from him the basics and the fine points of the then new field of ocular plastic and reconstructive surgery.

Hughes, Wendell L. *Reconstructive Surgery of the Eyelids.* St Louis, C V Mosby, 1943. The detailed review of the history of eyelid surgery in the first chapters of this book was originally prepared as a thesis for Hughes's 1941 application for membership in the American Ophthalmological Society, but because of its length (94 figures and 331 references) it was not printed in the Transactions of the AOS. The American Ophthalmic Plastic and Reconstructive Surgery Society was founded chiefly by former Hughes fellows, and this may account for that Society's unusual interest in the history of their subspecialty.

Stallard, H. B. *Eye Surgery.* Baltimore, Williams and Wilkins, 1946. (2nd edition 1950; 3rd edition, Bristol, John Wright & Sons, 1958,

and Baltimore, Williams & Wilkins, 1958; 4th edition, 1965; 5th edition 1973; 6th edition 1978 and 7th edition 1988 by Roper-Hall.) Stallard gave a prominent place to oculoplastic surgery (35%, 34% and 27% of the pages in each of the first 3 editions respectively). His book was a worldwide standard text in ophthalmic surgery for 30 years.

Fox, Sidney. *Ophthalmic Plastic Surgery.* New York, Grune and Stratton, 1952. (2nd edition 1958, 3rd edition 1963, fourth edition 1970, fifth edition 1976).

Dr. Fox had a large clinical practice in New York, and was on the staff of many hospitals including New York University. His popular text was concerned with the surgical problems of the lids and conjunctiva. He believed that there were too many procedures, and that most general ophthalmologists never got a chance to sort them out and master a few of them. He set out to correct this situation with a straightforward, declarative style and simple clear illustrations – the same confident style that he had used in 1944 in a small book called “Your Eyes” addressed to the general reader. In *Ophthalmic Plastic Surgery* he was openly opinionated and didn’t hesitate to throw some procedures on the trash heap that were quite popular at the time. His later book “Surgery of Ptosis” appeared in 1968, before Beard’s work, and was the first major textbook concerned only with the surgery of eyelid ptosis. Once again, he was impressed with how many ways there were to fix these things, and with the difficulty that most general ophthalmologists had in mastering the surgical principles involved. There were, naturally quite a few objections, to which he responded in subsequent editions by reorganizing and clarifying. His books are a rich source of older techniques because he was interested in the history of the way things had been done. He readily admitted that in surgical techniques, as in life, “we live and learn - and change”.

Mustardé, John Clark. *Repair and Reconstruction in the Orbital Region.* Edinburgh, E & S Livingstone, Ltd. 1966. 382 pages. US edition, Baltimore, Williams & Wilkins, 1966 (2nd edition, Edinburgh, Churchill Livingstone 1980, 400 pages; 3rd ed. 1991, 575 pages) Mustarde was a plastic surgeon with

a special interest in the face and orbit. In the early 1940s he worked with Stallard in a Cairo military hospital, then spent two years as a prisoner of war. After the war he worked with Sir Harold Gillies before returning to Scotland to practice. His 1966 book was immediately recognized as a helpful guide by an experienced surgeon.

Beard, Crowell. *Ptosis.* St Louis, Mosby, 1969. Illustrated by Joan Esperson. As soon as this book appeared Dr Beard became the world’s expert on the repair of ptosis of the eyelids; the book seemed to offer clinical insights and clear step by step instruction unavailable elsewhere. Beard was very explicit about the anatomical rationale for his procedure, depending on the type of ptosis. In its subsequent editions this book remained the standard work on ptosis. Dr Beard spent most of his academic career at the University of California San Francisco. There he was a greatly sought after consultant and teacher. Doctors crowded into his operating room to watch his surgery. A video of Dr Beard’s surgery was offered by the American Academy of Ophthalmology in 1976. A text by Beard and Quickert, M., *Anatomy of the Orbit* is a good supplement to this study. A fourth edition, called *Beard’s Ptosis* was co-authored by M. Callahan (Birmingham, Aesculapius, 1990) in which the text was expanded and revised but Beard’s basics were left untouched.

Jones, Lester T. and Wobig, J.L. *Surgery of the Eyelids and Lacrimal System.* Birmingham, AL, Aesculapius, 1976. Dr. Jones trained as an Eye, Ear, Nose, and Throat surgeon. To further his knowledge of anatomy he did minute dissections of the human orbit under water. This allowed visualization of tiny strands from major muscles and tendons that made interlacing attachments throughout the orbit. With this special expertise he helped write a series of booklets for the American Academy of Ophthalmology on anatomy. He applied this understanding of the orbit to devising surgical techniques with a rational anatomical basis. This resulted in some dramatic improvements in lacrimal and eyelid surgery.

Henderson, John W. with George M. Farrow and others *Orbital Tumors*. Philadelphia, Saunders, 1973. (2nd edition with Dr. George Farrow, New York, Brian C. Decker, 1980. 3rd edition with Jean Campbell, George Farrow and James Garrity, New York, Raven Press, 1993) In this book an ophthalmologist orbital surgeon gives practical, articulate advice and thereby contributes to the transfer of the care and management of orbital tumors from the neurosurgeon to the ophthalmologist. Walter E. Dandy's book, "Orbital Tumors", (NY, Oskar Piest, 1941) summarized the 1st half of the century on this subject at a time when it was clear that taking out an orbital tumor was often a neurosurgeon's job.

Dutton, Jonathan J. *Atlas of Clinical and Surgical Orbital Anatomy*. Philadelphia, Saunders, 1994. This atlas is a virtuoso display of orbital and periorbital anatomy. Histologic sections of the orbit that have been turned into layers of crisp instructional paintings by the medical illustrator Thomas G. Waldrop.

There are also sections on the eyelids and the lacrimal system. Somewhere, at this very moment, these images are probably being scanned into Powerpoint slides for teaching purposes.

Ocular Anatomy and Pathology

Twentieth century ophthalmic pathology grew from the anatomical knowledge of the previous century and the idea that diseases could be classified anatomically (ie, diseases of the cornea, diseases of the retina, etc). Important contributions were made by Antonio Scarpa (1752-1832), James Wardrop (1782-1869), John Dalrymple (1803-1852), William Bowman (1816-1892), Hans Virchow (1821-1902), Theodor Leber (1840-1917) and others. Although microscopes were in use throughout the 19th century, the histology of disease only blossomed after the introduction of tissue fixation techniques (J.E. Purkinje, 1787-1869), oil immersion lenses and substage condensers (G.B. Amici, 1786-1863; E. Abbé, 1840-1905) and the process of embedding the globe in paraffin and celloidin (P. Hänsell, 1840-1912)

Fuchs, Ernst (1851-1930). *Lehrbuch der Augenheilkunde*. Leipzig und Wien, F. Deuticke, 1889. Ernst Fuchs, who had trained in Vienna under Arlt and was Professor of Ophthalmology in Liege from 1881-1885, wrote a prize winning essay in 1884 on the causes and prevention of blindness and became the Professor at the second Eye Clinic in Vienna in 1885. There he undertook to write this book, a textbook of only one volume that summarized the material covered in his lectures. The book was quickly translated by Alexander Duane of New York and published in 1892 by the D. Appleton Company as "Textbook of Ophthalmology". It was an exceedingly popular text during the first half of the 20th Century: there were 18 editions in German, and most of the 10 editions in English (1892-1933) were closely monitored by Dr. Duane, and it became increasingly difficult to stick to the one volume format.

In the first edition there are only 17 figures showing what might be called microscopic anatomy, but Fuchs clearly believed that understanding the microscopic details of eye

diseases would lead to effective treatment. An entire generation of ophthalmologists in the first quarter of the 20th Century came to Vienna to hear him lecture, and they took home this book and the message that the microscope was the key to new knowledge.

Parsons, J. Herbert. (1868-1957) *The Pathology of the Eye*, 4 vols, London, Hodder & Stoughton, 1904-1908 (1st US ed - New York, G P Putnam's Sons, 1904-1908). Parsons acknowledged the previous work of Greef (1902-06) and Ginsberg (1903) of Berlin and then produced this classic set of volumes. This book helped to make ophthalmic pathology into a recognized field of specialization, and for decades remained the standard English reference work on this subject.

Salzmann, Maximilian. *Anatomie und Histologie des menschlichen Augapfels im Normalzustande, seine Entwicklung und sein Altern*. Leipzig und Wien, F. Deuticke, 1912. The book also appeared simultaneously from the University of Chicago Press as *The*

Anatomy and Histology of the Human Eyeball in the Normal State; its Development and Senescence, translated by E.V.L. Brown. This book was greatly admired and often brought home from Austria by ophthalmologists attending Fuchs' lectures. It was reprinted in 1931. There are nine very fine black and white collotype plates at the back of the book made by Max Jaffé in Vienna.

Fuchs, Adalbert. *Atlas of the Histopathology of the Eye.* **Leipzig & Vienna, Franz Deuticke, 1924.** Available in German and in English. Adalbert Fuchs was the son of Ernst Fuchs and an excellent ophthalmic pathologist. This atlas, the first ever with color plates (44 of them), was produced in response to a demand from Ernst Fuchs' students. Its purpose was to help the ophthalmologist to "attain a better anatomical foundation for his clinical knowledge".

Mann, Ida Caroline (1893-1983). *Development of the Human Eye.* **Cambridge, The University Press, 1928.** (2nd edition, London, 1949, New York, Grune and Stratton, 1950; 3rd updated edition 1964). Ida Mann was the first woman ophthalmic surgeon at Moorfields Eye Hospital. She had access to a large human embryology specimen collection at the Institute of Pathology, St Mary's Hospital, London and undertook a comprehensive study of the embryology of the eye. Building on the work of Bach and Seefelder (*Atlas zur Entwicklungsgeschichte des menschlichen Auges*, Leipzig, 1911-14), she made many major contributions to the subject and using her own illustrations, put them together in this book, the first comprehensive monograph devoted to the subject. The companion volume "Developmental Abnormalities of the Eye" came out in 1937 and was reprinted in 1957.

Collins, E. Treacher & Mayou, M. Stephen. *Pathology and Bacteriology of the Eye.* **Philadelphia, Blakiston, 1918.** This second edition was the first as a free standing text. It covers aberrations in development, neoplasms, injuries, infections, parasitic diseases and inflammation. The first edition (1911) was one of the volumes of a "System of Ophthalmic Practice" edited by the industrious Walter L. Pyle.

Wessely, Karl. *Auge.* Volume 11, in three parts of 1024, 534 and 641 pages, respectively, **Berlin, Julius Springer, 1928-1937.** This is the ophthalmic section of "Henke-Lubarsch" - a massive reference work, packed with information fundamental to Pathology, called the "Handbuch der Speziellen Pathologischen Anatomie und Histologie" edited by Friedrich Henke (1868-1943) and Otto Lubarsch (1860-1929). Henke-Lubarsch was produced over a 40 year span, starting in 1924. After the war it was continued under the editorship of Robert Rössle. These 2200 pages on Ocular Pathology (Vol 11) were edited by Karl Wessely of Munich and contain extensive contributions by Von Hippel, Greef, Ginsberg, Elschnig, von Szily, Löhlein and others.

Wolff, Eugene (1896-1954). *The Anatomy of the Eye and Orbit.* **Philadelphia, Blakiston, 1933.** (4th ed. 1954; 5th ed. Phila, Saunders, 1961, edited by Raymond Jack Last; 6th ed. 1968, R.J. Last; 7th ed. London, H.K. Lewis, 1976, edited by Roger Warwick; 8th ed. London, Chapman Hall, 1997 edited by Anthony Bron, Ramesh C. Tripathi and Brenda J. Tripathi.) Wolff, an English ophthalmologist, produced a book which became the standard anatomy text for ophthalmologists in training for the entire last two thirds of the century. He also wrote *A Pathology of the Eye* (Blakiston, 1935-1951) based on a series of lectures and demonstrations given at the Royal Westminster Ophthalmic Hospital.

Reese, Algernon B. *Tumors of the Eye.* **New York, Paul B. Hoeber, Inc., 1951.** (2nd edition 1963; 3rd edition 1976.) Dr. Reese worked at the Institute of Ophthalmology of the Presbyterian Hospital, and the Memorial Center for Cancer and Allied Diseases in New York. Working at these active institutions he collected a large series of patients with tumors of the eye and orbit. Although this is chiefly an oncology book, it had a profound influence on ophthalmic pathologists because there had not been a comparable book since Felix Lagrange in 1901. The book is organized with great clarity by tumor type and is well illustrated with Bethke and Quinlan drawings.

Friedenwald, Jonas S and Helenor Campbell Wilder, Edward Maumenee, Ted Sanders, John Keyes, Michael Hogan and W.C. & Ella Owens. *Ophthalmic Pathology: an Atlas and Textbook.* **Philadelphia, Saunders, 1952.** This multi-authored book was characteristic of the collaborative tone of American ophthalmic pathology throughout the rest of the century. The book was a joint project of the American Academy of Ophthalmology and Otolaryngology, and the Armed Forces Institute of Pathology and its starting point was to combine Friedenwald's text (*Friedenwald, Jonas S. (1897-1955) Pathology of the Eye, NY, Macmillan, 1929*) and General DeCoursey's Atlas (*DeCoursey, Elbert and Ash, J.E., Atlas of Ophthalmic Pathology, 1938; prepared at the Army Medical Museum, Office of the Surgeon General, U. S. Army, from material in the Registry of Ophthalmic Pathology, later to become the Armed Forces Institute of Pathology, and published by the AAO; 2nd ed. 1939; 3rd ed. 1942*). This turned out to be the first edition of what was to become the definitive text of ophthalmic pathology.

Hogan, Michael J., and Zimmerman, Lorenz (eds). *Pathology of the Eye.* **Philadelphia, Saunders, 1962.** This, the second edition became justly famous around the world and was perhaps the most influential ophthalmic pathology book of the century.

Spencer, William. *Ophthalmic Pathology.* **Philadelphia, Saunders, 1985.** The third and fourth editions of this massive book were edited by Wm. Spencer, again under the sponsorship of the American Academy of Ophthalmology and the Armed Forces Institute of Pathology. (3rd edition 1985, three volumes; 4th edition 1996, four volumes, Saunders.) The illustrations in the 1985 3rd edition place this three volume book well above its predecessors.

As new techniques and new understanding became available the book continued to grow, so that the 1996 4th edition, in four volumes, became a truly comprehensive and authoritative text. Pathologists working with other organs wish that they had a reference work of this quality in their area.

Hogan, Michael J., and Alvarado, Jorge A., Weddell, Joan E. *Histology of the Human Eye.* **Philadelphia, Saunders, 1971.** For 150 years the light microscope had been the histologist's chief instrument, and many histologists made famous use of it (Mueller, Schwann, Purkinje, von Kolliker, Bowman, E. Fuchs, Parsons, Salzmann, A. Fuchs, Duke-Elder/Wybar). Hogan and Alvarado took a major step forward with this text by including electron microscopy in the histologist's tool kit. The success of this book was due in part to the spectacular three-dimensional representations of ocular ultrastructure by Joan Esperson Weddell. Before this book, ophthalmologists knew next to nothing about electron microscopy of the eye, but when this book became part of their training, ophthalmologists learned to read in the ophthalmic literature about "endoplasmic reticulum" and "microtubules" without feeling the urge to turn the page immediately to the next article.