Books on Cardiac Surgery and Extracorporeal Circulation

“History is neither more nor less than biography on a large scale.”

Alphonse de Lamartine (1790-1869) French author, poet, historian, and statesman

2000s

Gravlee GP, Davis RF, Kurusz M, Utley JR (Eds.) Cardiopulmonary Bypass; Principles and Practice, Second Edition. Philadelphia: Lippincott Williams & Wilkins, 2000. [This textbook was expanded from the smaller first edition published in 1993 and included a perfusionist editor (M. Kurusz) who joined the original anesthesiologists and cardiac surgeon in recruiting experts to contribute chapters. Notably, a second history chapter was added to one that appeared in the first edition, which was essentially reprinted from Dr. C.W. Lillehei’s earlier one; the second described the well-known story of the genesis for the idea of a heart-lung machine by Dr. J.H. Gibbon, Jr. followed by one of the most thorough reviews of early extracorporeal experiments in the laboratory, including reproductions of original illustrations with detailed descriptions of how the circuits functioned, and the start of clinical perfusion in the 1950s. There are nine chapters on clinical applications, including conduct, unusual problems, and infrequent uses for specific types of patient pathologies.]

Zwischenberger JB, Steinhorn RH, Bartlett RH (Eds.) ECMO; Extracorporeal Cardiopulmonary Support in Critical Care (Second Edition). Ann Arbor, MI: Extracorporeal Life Support Organization, 2000. [This updated edition of the “ECMO Red Book” followed the popularity of the first one published five years earlier. Like the first, it was a “how to do it” guide from the collective experience of contributors involved daily in prolonged extracorporeal cardiopulmonary support. An addendum to the first chapter alluded to a prospective randomized trial for neonatal ECMO in the United Kingdom and the beginnings to expand ECMO use for adult respiratory failure.]

Newman SP, Harrison MJG (Eds.) The Brain and Cardiac Surgery; Causes of Neurological Complications and Their Prevention. Amsteldijk, Netherlands: Harwood Academic Publishers, 2000. [The idea for this book was from the Fourth International Brain and Cardiac Surgery Conference held in Oxford in 1996. Its intent was to provide an overview of the impact of cardiac surgery on the brain, causes of problems, and how surgical and anesthetic practice were contributory. Four sections first address the nature of the problem, then monitoring and mechanisms, surgical and anesthetic practice, and lastly, special problems including cardiac transplantation, circulatory support devices, and pediatric cardiac surgery. One chapter written by a perfusionist (M. Kurusz) reviews contemporary equipment used for cardiopulmonary bypass.]

Miller GW. King of Hearts; The True Story of the Maverick Who Pioneered Open Heart Surgery. New York: Crown Publishers, 2000. [A journalist tells the dramatic story of Dr. C. Walton Lillehei, who paved the way for widespread use of the bubble oxygenator for cardiopulmonary bypass after

performing a series of remarkable cross-circulation operations for repair of congenital cardiac defects in the 1950s. He also describes the extensive laboratory work that preceded clinical use of pacemakers and artificial heart valves.]

Hayes D. Let's Go on Bypass. Fulton, MD: Citilites Press, 2001. [A clinical perfusionist, skilled in operation of a heart-lung machine, was also a skilled cartoonist. He dedicated his collection "To perfusionists all over the world", who undoubtedly can identify with many of the scenes and humorous captions accompanying his drawings.]

Weisse AB. Heart to Heart; The Twentieth Century Battle against Cardiac Disease, An Oral History. New Brunswick, NJ: Rutgers University Press, 2002. [There are 16 pioneer interview transcripts containing questions and comments posed by the author to the interviewees. Many previously unreported anecdotes emerge from these dialogues, and there are important details on development of the pacemaker, roller pump, intra-aortic balloon pump, cardiac assist devices, and the artificial heart.]

Kouchoukas NT, Blackstone EH, Doty DB, Hanley FL, Karp RB. Kirklin/Barratt-Boyes Cardiac Surgery; Morphology, Diagnostic Criteria, Natural History, Techniques, Results, and Indications, Third Edition, Vols. 1 and 2. Philadelphia: Churchill Livingstone, 2003. [These two massive volumes (1,938 pages, not including the index), by five renowned cardiac surgeons, are the product of an extraordinary update on the original definitive text by Drs. Kirklin and Barratt-Boyes first published in 1986. All chapters deal with every conceivable cardiac condition, historical context, morphology, natural history of the disease, operations, and results. Of most interest for perfusionists is Chapter 2 entitled, "Hypothermia, Circulatory Arrest, and Cardiopulmonary Bypass" (64 pages with 22 pages of references). The word perfusionist does not appear in the index, but it is used a few times in this chapter in an acknowledgement of their expertise, along with that of the anesthesiologist, which the authors suggest "should allow adaptation to the surgical situation while ensuring the greatest possible safety for the patient."]

Hensley FA Jr., Martin DE, Gravlee GP (Eds.) A Practical Approach to Cardiac Anesthesia, Third Edition. Philadelphia: Lippincott Williams & Wilkins, 2003. [Once again, progress in the field mandated an update to the two earlier versions of this text aimed primarily at cardiac anesthesiologists. An updated chapter on cardiopulmonary bypass circuit design and use was authored by three perfusionists (M. Kurusz, A.H. Stammers, J. Toomasian). While still claiming to be a "pocket-sized" reference, the bulk might be better accommodated in a backpack or hand-carried, if possible. Key references are highlighted in bold font at the end of chapters.]

Ruhlman M. Walk on Water; Inside an Elite Pediatric Surgical Unit. New York: Penguin Putnam, 2003. [This dramatic storytelling comes from an award-winning journalist with a flair for words not typically found in clinical textbooks. While some patients' names and details of their hospitalizations have been purposely deidentified, the key figure in the stories is a real pediatric cardiac surgeon, Dr. Roger Mee, practicing at the Cleveland Clinic Foundation. Readers are drawn into the triumphs and tragedies of sick children and their families as they face surgery to palliate or

cure congenital cardiac afflictions. All members of the surgical team are often forced to put in long hours because of the urgent needs of patients, but it's only the surgeon who must face the patients' families to report outcomes. This book is compelling and will be familiar to anyone who has worked in a cardiac operating room.]

Lich BV, Brown DM. The Manual of Clinical Perfusion, Second Edition Updated. Fort Myers, FL: Perfusion.com, 2004. [The authors published this version, which followed the same format of the original manual from 1997 written by clinical perfusionists John Brodie and Ronald Johnson. The text is straightforward and important words and concepts are highlighted. Many drawings and tables add useful information for practicing perfusionists, perfusion students, and others who work with open-heart surgery patients. No references accompany the chapters indicating the material is based on the authors' personal experience, accumulated information from varying sources, and prevailing beliefs held by perfusionists. There is, however, a two-page bibliography of relevant books on cardiac surgery and perfusion. Appendices include a list of perfusion educational programs, normal laboratory values, formulas and nomograms, and manufacturer and product information.]

Salerno TA, Ricci M (Eds.) Myocardial Protection. Elmsford, NY: Blackwell Publishing, Futura Division, 2004. [During cardiothoracic surgery for adults and children—for myocardial revascularization, valve repair or replacement, correction of congenital defects, cardiac transplantation, implantation of mechanical circulatory support, and major aortic surgery, a wide variety of methods have been used to protect the heart when it is temporarily deprived of blood flow. This text addresses those methods in this comprehensive text. The contributors explain how they manage it and report their results. Preconditioning, continuous coronary perfusion, use of warm or cold temperatures, antegrade or retrograde, crystalloid- or blood-based solutions, primary surgery or redo surgery, intermittent aortic cross-clamping, beating heart or arrested heart—it is all here. Chapter 1 succinctly recounts the history of myocardial protection that began in the era of experimental physiologists in the 19th century, including Sydney Ringer (yes, the familiar electrolyte solution is named after him). The first surgeon to use elective cardiac arrest was Mr. Denis Melrose in the mid-1950s, but readers learn his use of potassium to stop the heart in diastole was intended to reduce the risk of air embolism and not to protect the heart. The specter of "stone heart" was described by Cooley in the 1960s after prolonged ischemic arrest. The 1970s saw a resurgence of cardioplegia techniques, and this book is the definitive collection on the topic, but for perfusionists it regrettably does not describe details of devices and methodology for delivery of cardioplegia.]

Jonas RA (Ed.) Comprehensive Surgical Management of Congenital Heart Disease. London: Arnold, 2004. [This magnificent text is from one of the world's leading pediatric cardiac surgeons. Importantly, one entire section with five chapters is authored by his perfusion team to describe their cardiopulmonary bypass practices—hardware, priming solutions, blood gas management, hypothermia with reduced flow or circulatory arrest, and myocardial protection. The two other sections provide background on anesthesia and postoperative care and surgical approaches for a variety of congenital cardiac anomalies. The figures drawn by Rebekah Dodson are remarkable and show exactly what is done surgically for correction or palliation in infants and children.]

Goldman BS, Bélanger S (Eds). Heart Surgery in Canada; Memoirs, Anecdotes, History & Perspective. USA: Xlibris, 2005. [This compendium contains superbly written chapters on early experiences with rudimentary heart-lung machines, the pioneering perfusionists who assembled and operated them, and documents the development of cardiac surgical programs at major centers in Canadian provinces. There is a chapter by one of the early pioneering perfusionists, James MacDonald, who graciously pays tribute to the contributions of his many colleagues while recounting his experiences first at Dalhousie University in Halifax, Nova Scotia and then at London Health Sciences Centre in London, Ontario. No part of history is left out—from monkey lung oxygenators to hypothermia in the 1950s to speculations on future trends in the 21st century.]

Meurs KV, Lally KP, Peek G, Zwischenberger JB (Eds.) ECMO; Extracorporeal Cardiopulmonary Support in Critical Care, Third Edition. Ann Arbor, MI: Extracorporeal Life Support Organization, 2005. [Chapters that appeared in previous editions of the "ECMO Red Book" have been updated, and ten new chapters are added. For ECMO specialists, respiratory therapists, and perfusionists charged with hourly management and monitoring of the extracorporeal circuit there is an excellent chapter on the equipment and devices used for this remarkable medical technology. Another superb chapter addresses safety issues by drawing a distinction between system versus individual errors and highlights the ongoing need to maintain team competence. The value of the ELSO Registry is described, and there is a chapter on legal considerations. All chapters, as before, contain many figures, summaries, and pertinent references. The editors dedicated this edition to the "father" of ECMO, Dr. Robert H. Bartlett, who they deem as *the* critical care physician.]

Barr B. The Life of Nazih Zuhdi; Uncharted Voyage of a Heart. Oklahoma City: Oklahoma Heritage Association, 2005. [This is a biography about a cardiac surgeon's training with pioneers Drs. Clarence Dennis and C. Walton Lillehei and his own subsequent contributions, which included hemodilution perfusion during cardiopulmonary bypass, an experimental artificial heart, bioprosthetic heart valves, and major organ transplantation.]

Kaplan JA, Reich DL, Lake CL, Konstadt SN (Eds.) Kaplan's Cardiac Anesthesia, Fifth Edition. Philadelphia: Elsevier Saunders, 2006. [This massive (1,276 pages) textbook updates previous editions with an emphasis to inform cardiac anesthesiologists. All chapters are written by physicians or PhD-level professors in academic settings. There is a whole section with four chapters on extracorporeal circulation, the first of which contains a minor historical error insofar as Dr. John Gibbon's successful case in 1953 is reported as surgery for mitral stenosis instead of closure of a secundum atrial septal defect. That chapter alone has >400 references, and all chapters are chock-full of illustrations, tables, and photographs. To aid readers, each chapter contains key points, much like a scientific abstract, that serve to alert readers of what follows.]

Broers H (translated by K. Ashton). Inventor for Life; The Story of W.J. Kolff, Father of Artificial Organs. Kampen, Netherlands: B&V Media Publishers, 2006. [This meticulously researched and illustrated biography covers all the important contributions of the "Father of Artificial Organs." There are direct quotations from the subject and some of those who worked with him and a detailed recounting of animal and human artificial heart implants.]

McRae D. Every Second Counts; The Race to Transplant the First Human Heart. New York: GP Putnam's Sons, 2006. [This book describes the dramatic competition to perform the first human heart transplant by surgeons on two continents. It contains details not previously well-known surrounding these efforts and the aftermath initially characterized by exuberance followed by despair as most patients died within weeks after receiving a new heart.]

Goor DA. The Genius of C. Walton Lillehei and the True History of Open Heart Surgery. New York: Vantage Press, 2007. [This biography contains details of the controversial but pioneering cross-circulation experience at the University of Minnesota in the mid-1950s. It has chapters on the development and clinical use of heart-lung machines, artificial heart valves, cardiac transplantation, and the total artificial heart. In telling the story, the author acknowledges the major contributions of other pioneering cardiac surgeons. He has done his research and provides clarifications on dates and accepted claims of priority by some surgeons, not the least of which is Dr. John Gibbon, Jr. and adds fascinating new evidence to the stories uncritically repeated so many times since the events unfolded. This is a must read if one wishes to learn of the "true history" as claimed in the title of this book. Also true to its title, this book includes Dr. Lillehei's curriculum vitae and lists his >650 scientific publications.]

Liotta D. Amazing Adventures of a Heart Surgeon; The Artificial Heart: The Frontiers of Human Life. New York: iUniverse, Inc., 2007. [The author recounts the first clinical uses of mechanical circulatory assist and the controversial total artificial heart implant at Texas Heart Institute on Good Friday in April 1969.]

Peto J (Ed.) The Heart. New Haven, CN: Yale University Press, 2007. [This is a curious historical treatise on, true to its title, *the heart*. The Foreword is written by Sir Magdi Yacoub, who admits, "Watching the heart beating during a cardiac operation can be mesmerizing…" The chapters begin with the Egyptians, who we are told always kept the heart inside the deceased's chest so it could be weighed by the gods to judge whether the person was suitable for the afterlife. There is even a chapter on Elvis Presley and the story of "Heartbreak Hotel." The last chapter, not surprisingly, concerns the artificial heart. The contents of this book arose from an exhibit at the Wellcome Collection in London. It is printed on heavy stock and illustrated with superb figures, many in color. Another fascinating inclusion is transcripts of interviews with surgeons and their patients who underwent cardiac transplantation.]

Mongero LB, Beck JR (Eds.) On Bypass; Advanced Perfusion Techniques. Totowa, NJ: Humana Press, 2008. [The authors are clinical perfusionists at a busy, well-known center, New York Presbyterian/Columbia College of Physicians and Surgeons. Chapters written mostly by physicians or PhDs address 12 relevant topics, but by no means is this book comprehensive for the many aspects of cardiopulmonary bypass. There are some perfusionist authors (K.A. Charette, E. Darling, J. Markham, D.Y. Park, B. Searles) in addition to the editors, and they are purposely paired with cardiac surgeons as co-authors to emphasize the team approach. There is no history chapter because the focus is on clinical practice. In fact, nearly half of the book's pages consists of Policy and Procedure Guidelines as used at the editors' institution. These cover special procedures, daily

routine procedures, pathologies, ventricular assist, and pediatrics. Members of the perfusion team at the time of publication are listed; all were Certified Clinical Perfusionists. The benefit of the book, as expressed in the Preface, is to share guides with readers to enhance patient care.]

Stoney WS. Pioneers of Cardiac Surgery. Nashville, TN: Vanderbilt University Press, 2008. [This contains transcripts of 38 wonderful interviews of pioneering cardiac surgeons who made important contributions to the development of cardiac surgery as a specialty. There is a chapter entitled, "A Short History of Cardiac Surgery" that sets the stage for the later developments chronicled by the pioneers. Sections are arranged by types of surgery, and one is devoted to cardiac transplantation and the artificial heart.]

Gravlee GP, Davis RF, Stammers AH, Ungerleider RM (Eds.) Cardiopulmonary Bypass; Principles and Practice, Third Edition. Philadelphia: Walters Kluwer Lippincott Williams & Wilkins, 2008. [This volume expands and updates the previous editions of this textbook. A clinical perfusionist served as one of the editors (A.H. Stammers) and a cardiac surgeon (R.M. Ungerleider) replaced the late Dr. Joe R. Utley. The two history chapters that appeared in the second edition are retained, as are the conventional sections on equipment; physiology and pathophysiology; hematology; clinical applications; and neonates, infants, and children, the last of which was greatly expanded. Two new chapters on safety and teamwork are included, and the growing use of so-called minimally invasive extracorporeal circulation has its own new chapter. The book remains a comprehensive source of clinical information with exposition of underlying basic scientific principles.]

Hensley FA Jr., Martin DE, Gravlee GP (Eds.) A Practical Approach to Cardiac Anesthesia, Fourth Edition. Philadelphia: Wolters Kluwer Lippincott Williams & Wilkins, 2008. [This latest tome was published just four years after the third edition and is once again expanded and updated from the previous volumes. It is a hefty book, measuring 7-inches by 10-inches and is 1.5-inches thick—impractical for fitting in one's lab coat pocket. The editors have maintained the outline format with liberal use of figures and tables. As is so often the case, there are just a few perfusionist authors (N. Brindisi, M. Kurusz, A.H. Stammers) while most of the others are cardiac anesthesiologists and cardiac surgeons.]

Racer D. To Change the Heart of Man; The Life of Harold D. Kletschka, M.D., Father of the Artificial Heart. Chanhassen, MN: Kletschka Publishing, 2009. [This is a laudatory biography of a man who came from a humble background and became a physician educated at the University of Minnesota during the so-called golden era when Dr. C.W. Lillehei and others were innovating for the emerging field of cardiac surgery. Dr. Kletschka is perhaps best known for inventing the centrifugal blood pump, which he envisioned as an implantable artificial heart. Instead, it found wide use as an alternative to the familiar roller pump during cardiopulmonary bypass. The author struggled to find funding to commercialize the pump, and he eventually earned a law degree and wrote a treatise on human life relying on scientific, legal, and moral certainties. This is a fascinating portrait of a most unusual man, the boy who graduated from Brainerd High School and was, indubitably, a qualified brainard.]

Ghosh S, Falter F, Cook DJ (Eds.) Cardiopulmonary Bypass. New York: Cambridge University Press, 2009. [This is a primer for perfusionists written mostly by United Kingdom contributors. This book is reasonably detailed and includes chapters on circuit setup, conduct of cardiopulmonary bypass, myocardial protection, cerebral morbidity, and ECMO. At just 200 pages, this paperback could serve as a pump-side resource for the seasoned perfusionist or as an introductory guide to newcomers of the subject. In lieu of references, each chapter ends with a list of "Further Suggested Readings."]