

FOURTEENTH EDITION

TEXTBOOK OF SURGERY

The Biological Basis of
Modern Surgical Practice

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The Biological Basis of
Modern Surgical Practice

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SURGICAL MANAGEMENT OF SUPPURATIVE MEDIASTITIS

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THE MULTIPLE ENDOCRINE NEOPLASIAS

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PERITONEOVENOUS SHUNTS FOR INTRACTABLE ASCITES

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SURGICAL COMPLICATIONS

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SURGICAL MANAGEMENT OF SUPPURATIVE MEDIASTITIS

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SOFT TISSUE SARCOMAS

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CARCINOMA OF THE COLON, RECTUM, AND ANUS

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NODULAR GOITER AND BENIGN AND MALIGNANT NEOPLASMS OF THE THYROID

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FRACTURES OF THE TIBIA, FIBULA, ANKLE, AND FOOT

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TRANSPOSITION OF THE GREAT ARTERIES

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CARCINOMA OF THE STOMACH

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THE USE OF CARDIOVASCULAR PHARMACOLOGIC AGENTS IN
SURGICAL PATIENTS

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LUNG TRANSPLANTATION

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Electrophysiology Service, Duke University Hospital.
CONGENITAL LESIONS OF THE CORONARY CIRCULATION; CARDIAC
PACEMAKERS

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ANESTHESIA

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SURGICAL ASPECTS OF THE ACQUIRED IMMUNODEFICIENCY
SYNDROME; THE THYROID GLAND: HISTORICAL ASPECTS AND
ANATOMY; PHYSIOLOGY; HYPERTHYROIDISM; THYROIDITIS;
CHRONIC PULMONARY EMBOLISM; ARTERIOVENOUS FISTULAS

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Center. Attending Surgeon and Head, Section of Vascular Sur-
gery, Duke University Medical Center, Durham, North Caro-
lina.
PHYSIOLOGY OF THE ARTERIAL SYSTEM; FEMOROPOPLITEAL AND
FEMOROINFRAPLOPLITEAL BYPASS; SURGICAL MANAGEMENT OF
RENOVASCULAR HYPERTENSION

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eral Hospital, Durham, North Carolina.
FRACTURES OF THE PELVIS, FEMUR, AND KNEE

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ABDOMINAL WALL, UMBILICUS, PERITONEUM, MESENTERIES,
OMENTUM, AND RETROPERITONEUM

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DIAGNOSTIC THORACOSCOPY

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WOUND HEALING: BIOLOGIC AND CLINICAL FEATURES

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geon-in-Chief, Brigham and Women's Hospital, Boston, Mas-
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SUBCLAVIAN STEAL SYNDROME

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THE HEART: CARDIAC CATHETERIZATION AND PERCUTANEOUS
CORONARY ANGIOPLASTY

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ifornia.
TUMORS OF THE DUODENUM AND SMALL INTESTINE

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TRACHEOSTOMY AND ITS COMPLICATIONS

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SURGICAL COMPLICATIONS

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NEURORADIOLOGY

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THE SPLEEN

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Duke University Medical Center, Durham. Veterans Admin-
stration Medical Center, Durham, North Carolina.
THE LIVER: ANATOMY AND PHYSIOLOGY; PYOGENIC AND AMEBIC
LIVER ABSCESS; NEOPLASMS OF THE LIVER; HEMOBILIA

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ARTERIAL SUBSTITUTES

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ULCERATIVE COLITIS

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SURGICAL COMPLICATIONS

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NEUROSURGICAL TREATMENT OF EPILEPSY

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SURGICAL TREATMENT OF PULMONARY TUBERCULOSIS

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THE MOUTH, TONGUE, JAWS, AND SALIVARY GLANDS

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FAT EMBOLI SYNDROME

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PRINCIPLES OF OPERATIVE SURGERY: ANTISEPSIS, TECHNIQUE, SUTURES, AND DRAINS

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THE BILIARY SYSTEM: ACUTE CHOLECYSTITIS; CHRONIC CHOLECYSTITIS AND CHOLELITHIASIS; CHOLANGITIS

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PRINCIPLES OF IMMUNOSUPPRESSION

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RENAL TRANSPLANTATION

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NEUROSURGICAL RELIEF OF PAIN; NEUROSURGICAL TREATMENT OF EPILEPSY; STEREOTACTIC NEUROSURGERY

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TUMOR MARKERS

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HYPOPLASTIC LEFT HEART SYNDROME

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THE HAND: TENDON INJURY AND REPAIR

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HERNIAS

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EBSTEIN'S ANOMALY

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NEUROSURGERY: CONGENITAL ABNORMALITIES

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SURGICAL MANAGEMENT OF MYASTHENIA GRAVIS

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SURGICAL TREATMENT OF HYPERTROPHIC CARDIOMYOPATHY

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THE ARTIFICIAL HEART

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THE SMALL INTESTINE: CARCINOID TUMORS AND THE CARCINOID SYNDROME

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THE ESOPHAGUS: HISTORICAL ASPECTS AND ANATOMY; PHYSIOLOGY; DISORDERS OF ESOPHAGEAL MOTILITY; DIVERTICULA AND MISCELLANEOUS CONDITIONS OF THE ESOPHAGUS; ESOPHAGOSCOPY; TUMORS OF THE ESOPHAGUS.

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VENTRICULAR SEPTAL DEFECTS; DOUBLE OUTLET RIGHT VENTRICLE

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LYMPHOMA OF THE STOMACH

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THE URINARY SYSTEM

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RENAL TRANSPLANTATION

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THE HEART: CARDIAC CATHETERIZATION AND PERCUTANEOUS CORONARY ANGIOPLASTY

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PRINCIPLES OF PREOPERATIVE PREPARATION OF THE SURGICAL PATIENT

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THE SURGICAL APPROACH TO MORBID OBESITY

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ARTERIAL SUBSTITUTES; RAYNAUD'S SYNDROME

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BURNS: INCLUDING COLD, CHEMICAL, AND ELECTRIC INJURIES

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BURNS: INCLUDING COLD, CHEMICAL, AND ELECTRIC INJURIES

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BITES AND STINGS

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CARDIOPULMONARY RESUSCITATION; THE CORONARY CIRCULATION; MITRAL AND TRICUSPID VALVE DISEASE

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VENOUS INJURIES

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FRACTURES OF THE SPINE

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THE ARTIFICIAL HEART

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SURGICAL COMPLICATIONS OF CIRRHOSIS AND PORTAL HYPERTENSION

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CHANGES IN VENOUS AUTOGRAFTS USED AS AORTOCORONARY CONDUITS

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ABDOMINAL WALL, UMBILICUS, PERITONEUM, MESENTERIES, OMENTUM, AND RETROPERITONEUM

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GALLSTONE ILEUS AND FISTULA

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THE COLON AND RECTUM: SURGICAL ANATOMY AND OPERATIVE PROCEDURES; PHYSIOLOGY; DIAGNOSTIC STUDIES; INTESTINAL ANTISEPSIS

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HEMOBILIA

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PULMONARY EMBOLISM: CHRONIC PULMONARY EMBOLISM; DISORDERS OF THE ARTERIAL SYSTEM: INTRODUCTION; ANATOMY; ANEURYSMS; SUBCLAVIAN ARTERY ANEURYSMS; VISCERAL ARTERIAL ANEURYSMS; AORTIC ABDOMINAL ANEURYSMS; THROMBO-OBLITERATIVE DISEASE OF THE AORTA AND ITS BRANCHES; TAKAYASU'S ARTERITIS; THROMBOTIC OBLITERATION OF THE ABDOMINAL AORTA AND ILIAC ARTERIES (LERICHE'S SYNDROME); ILIAC ARTERIAL OCCLUSION; ARTERIOVENOUS FISTULAS; CARCINOMA OF THE LUNG; CONGENITAL DEFORMITIES

OF THE CHEST WALL; THE MEDIASTINUM; PATENT DUCTUS ARTERIOSUS, COARCTATION OF THE AORTA. AORTOPULMONARY WINDOW, AND ANOMALIES OF THE AORTIC ARCH; THE TETRALOGY OF FALLOT; THE CORONARY CIRCULATION; CONGENITAL LESIONS OF THE CORONARY CIRCULATION; CARDIAC NEOPLASMS

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THE IMMUNOLOGY OF TRANSPLANT ANTIGENS; MECHANISMS AND CHARACTERISTICS OF ALLOGRAFT REJECTION

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VASCULAR COMPRESSION OF THE DUODENUM

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ACUTE RENAL FAILURE IN SURGICAL PATIENTS: PREVENTION AND TREATMENT

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PULMONARY INFECTIONS; THE PLEURA AND EMPYEMA

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IMMUNOBIOLOGY AND IMMUNOTHERAPY OF NEOPLASTIC DISEASE; MELANOMA

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THE SKIN: FUNCTIONAL, METABOLIC, AND SURGICAL CONSIDERATIONS

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THE SPLEEN

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FLUID AND ELECTROLYTE MANAGEMENT OF THE SURGICAL PATIENT

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CIRCULATORY PROBLEMS OF THE UPPER EXTREMITY; THORACIC OUTLET SYNDROME

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CARDIAC NEOPLASMS

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PRINCIPLES OF IMMUNOSUPPRESSION

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CONGENITAL AORTIC STENOSIS

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ABDOMINAL WALL, UMBILICUS, PERITONEUM, MESENTERIES, OMENTUM AND RETROPERITONEUM

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PERFORATION OF THE ESOPHAGUS: SPONTANEOUS (BOERHAAVE'S SYNDROME), TRAUMATIC, AND FOLLOWING ESOPHAGOSCOPY; HIATAL HERNIA AND GASTROESOPHAGEAL REFLUX

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THE ROLE OF COMPUTERS IN SURGICAL PRACTICE

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SURGICAL DISORDERS OF THE EARS, NOSE, PARANASAL SINUSES, PHARYNX, AND LARYNX

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PANCREAS TRANSPLANTATION

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TRANSPLANTATION: ORGAN PRESERVATION

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THE PITUITARY AND ADRENAL GLANDS

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SURGICAL DISORDERS OF THE PERICARDIUM

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THE HEART: CARDIAC CATHETERIZATION AND PERCUTANEOUS CORONARY ANGIOPLASTY

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THE ACUTE ABDOMEN

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LIVER TRANSPLANTATION

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PANCREAS TRANSPLANTATION

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TRANSPLANTATION: HISTORICAL ASPECTS

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CORROSIVE STRICTURES OF THE ESOPHAGUS

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APPENDICITIS

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THE STOMACH AND DUODENUM

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DISORDERS OF THE ANAL CANAL

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LIVER TRANSPLANTATION

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SURGICAL ASPECTS OF THE ACQUIRED IMMUNODEFICIENCY SYNDROME

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REOPERATION FOR CORONARY BYPASS

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LIVER TRANSPLANTATION

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REPLANTATION OF AMPUTATED LIMBS AND DIGITS

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BRONCHOSCOPY; ATRIAL SEPTAL DEFECTS, OSTIUM PRIMUM

DEFECTS, AND ATRIOVENTRICULAR CANALS; THE TETRALOGY OF FALLOT

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SURGICAL MANAGEMENT OF FAILED ANGIOPLASTY

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TRUNCUS ARTERIOSUS

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ANESTHESIA

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SURGICAL MANAGEMENT OF MYASTHENIA GRAVIS

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THE MALE GENITAL SYSTEM

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THE MULTIPLE ENDOCRINE NEOPLASIAS; THE PARATHYROID GLANDS; THE PITUITARY AND ADRENAL GLANDS

H. Brownell Wheeler, M.D.

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THROMBOANGIITIS OBLITERANS (BUERGER'S DISEASE)

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ACQUIRED DISORDERS OF THE AORTIC VALVE

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NEUROSURGERY: HISTORICAL ASPECTS; INTRACRANIAL TUMORS; SPONTANEOUS INTRACRANIAL AND INTRASPINAL HEMORRHAGE; INTRACRANIAL INFECTIONS; INTRASPINAL TUMORS; RUPTURED LUMBAR INTERVERTEBRAL DISC; CERVICAL DISC LESIONS; PERIPHERAL NERVE INJURIES

Douglas W. Wilmore, M.D.

Frank Sawyer Professor of Surgery, Harvard Medical School. Clinical Director, Nutrition Support Service, Brigham and Women's Hospital; Research Director, Laboratory for Surgical Metabolism and Nutrition, Boston, Massachusetts.

HOMEOSTASIS: BODILY CHANGES IN TRAUMA AND SURGERY

Walter G. Wolfe, M.D.

Professor of Surgery, Attending Surgeon, Duke University Medical Center, Durham, North Carolina.

TRAUMATIC ANEURYSMS OF THE AORTA; DISSECTING ANEURYSMS OF THE AORTA; ANEURYSMS OF THE THORACIC AORTA; DISORDERS OF THE LUNGS, PLEURA, AND CHEST WALL; ANATOMY; CLINICAL AND PHYSIOLOGIC EVALUATION OF PULMONARY FUNCTION

Bruce G. Wolff, M.D.

Associate Professor of Surgery, Mayo Medical School. Consultant, General Surgery and Colon and Rectal Surgery, Rochester Methodist Hospital and St. Marys Hospital, Rochester, Minnesota.

CROHN'S DISEASE (REGIONAL ENTERITIS)

Charles J. Yeo, M.D.

Associate Professor of Surgery, The Johns Hopkins University School of Medicine. Attending Surgeon, The Johns Hopkins Hospital, Baltimore, Maryland.

THE PANCREAS

Michael J. Zinner, M.D.

Professor and Chairman, Department of Surgery, University of California, Los Angeles School of Medicine. Chairman, Department of Surgery, UCLA Medical Center; Attending Surgeon, Wadsworth Veterans Administration Hospital and Olive View Medical Center, Los Angeles, California.

THE COLON AND RECTUM: SURGICAL ANATOMY AND OPERATIVE PROCEDURES; PHYSIOLOGY; DIAGNOSTIC STUDIES; INTESTINAL ANTISEPSIS

Karl A. Zucker, M.D.

Associate Professor, Department of Surgery, University of Maryland School of Medicine. Surgeon, University of Maryland Hospital; Assistant Chief of Staff of Surgical Services, Loch Raven Veterans Administration Hospital, Baltimore, Maryland.

VOLVULUS OF THE COLON

PREFACE

The fourteenth edition of the *Textbook of Surgery* is a completely revised and updated version that provides a thorough description of the broad field of surgery. The first edition of this text was published in 1936, and it has since been regularly revised at appropriate intervals. The traditions of this text have been maintained in seeking internationally respected contributors for each chapter as well as the policy of presenting a complete update of each subject with new illustrations and bibliographic references. In this edition the basic scientific aspects of surgical disorders have been given prime attention in view of their increasing significance in the thorough understanding of clinical problems. The importance of this knowledge has been emphasized by the American Board of Surgery as well as in continuing education courses.

It is remarkable to reflect upon the many advances that have been made in surgery since the last edition was published in 1986. Remarkable achievements have been made in preoperative and postoperative care, nutrition, metabolism, cancer chemotherapy, antibiotics, tumor markers, open heart surgery, and the role of computers in the diagnosis and treatment of surgical disorders. To remain abreast of the field in the 1990s, twelve entirely new sections have been added to cover recent advances of special significance. These include

"Surgical Aspects of the Acquired Immunodeficiency Syndrome" by Drs. Douglas S. Tyler and H. Kim Lysterly

"Lung Transplantation" by Drs. Donald E. Low and Joel D. Cooper

"Tumor Markers" by Drs. Jeffrey A. Norton and Douglas L. Fraker

"Extracorporeal Membrane Oxygenation" by Dr. Robert H. Bartlett

"Surgical Management of Suppurative Mediastinitis" by Drs. Thomas J. Krizek and John G. Lease

"Penetrating Cardiac Injuries" by Dr. Fred A. Crawford, Jr.

"Hypoplastic Left Heart Syndrome" by Dr. William I. Norwood

"Surgical Management of Failed Angioplasty" by Dr. Peter Van Trigt

"Reoperation for Coronary Bypass" by Dr. George S. Tyson

"Kawasaki's Disease" by Dr. Thomas A. D'Amico

"Surgical Treatment of Hypertrophic Cardiomyopathy" by Dr. H. Newland Oldham, Jr.

"The Role of Computers in Surgical Practice" by Dr. Peter K. Smith

The sections have been arranged in a consistent format, beginning with a brief survey of the historic advances that have brought the subject to its present status, followed by the anatomic, pathologic, physiologic, biochemical, bacteriologic, immunologic, genetic, and pharmacologic features of each disorder. Following presentation of these basic scientific aspects of surgical problems, emphasis is then placed upon a review of the clinical manifestations, the findings on physical examination, and the diagnostic and therapeutic aspects of each condition.

The international impact of the *Textbook of Surgery* has been gratifying and continues to heighten each year. It has been translated into Spanish, Japanese, Portuguese, and Italian. For more than fifty years the fundamental goal of this text has been straightforward in its objective to serve the needs of all those involved in the science of surgery including medical students, surgical residents, practicing surgeons, and teachers of surgery throughout the world.

DAVID C. SABISTON, JR.