



1001  
E602.2

8691099

# OPERATIVE TECHNIC

IN

## SPECIALTY SURGERY

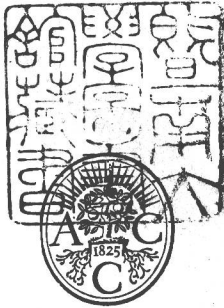
Edited by WARREN H. COLE, M.D., F.A.C.S., Professor of Surgery and Head of the Department, University of Illinois College of Medicine; Chief Surgeon, Illinois Research and Educational Hospitals, Chicago

*With 67 contributing authors*

SECOND EDITION

贈送書

Introduction by Allen O. Whipple



APPLETON-CENTURY-CROFTS, INC.  
NEW YORK

Copyright, © 1956, by

APPLETON-CENTURY-CROFTS, INC.

*All rights reserved. This book or parts thereof, must not be reproduced in any form without permission of the publisher.*

Library of Congress Card Number: 56-5014

Copyright, 1949, by Appleton-Century-Crofts, Inc.

PRINTED IN THE UNITED STATES OF AMERICA

To my wife

Clara

without whose patience and understanding  
editorship of this work could not have  
been accomplished



## AUTHORS

LEROY C. ABBOTT, M.D., F.A.C.S.

Professor of Orthopaedic Surgery and Chairman of the Department, University of California Medical School; Chief, Orthopaedic-Surgical Service, Children's Hospital, Franklin Hospital, Consulting Orthopaedic Surgeon, San Francisco City and County Hospital, Veterans Hospital, San Francisco

SURGICAL APPROACHES TO THE JOINTS

CARL E. BADGLEY, B.S., M.D., F.A.C.S.

Professor of Surgery, University of Michigan Medical School; in Charge of Section of Orthopaedic Surgery, University Hospital, Ann Arbor, Michigan

DEFORMITIES AND NEOPLASMS OF THE BONE

HENRY T. BAHNSON, M.D., F.A.C.S.

Associate Professor of Surgery, Johns Hopkins University; Surgeon, Johns Hopkins Hospital, Baltimore

ANEURYSM OF THE AORTA

CLAUDE S. BECK, M.D., F.A.C.S.

Professor of Cardiovascular Surgery, Western Reserve University; Associate Surgeon, University Hospitals, Consultant in Cardiovascular Surgery, Mount Sinai Hospital, Cleveland

THE HEART AND PERICARDIUM EXCLUDING CONGENITAL AND VALVULAR LESIONS

HOWARD A. BROWN, M.D., F.A.C.S.

Clinical Professor of Neurological Surgery, University of California Medical School; Chief, Neurological Service, and Chief of Staff, Franklin Hospital, San Francisco

SCALP, CRANIUM, AND BRAIN

JAMES BARRETT BROWN, M.D., F.A.C.S.

Professor of Clinical Surgery, Washington University School of Medicine; Associate Surgeon, Barnes Hospital, St. Louis Children's Hospital, St. Louis; Senior Civilian Consultant in Plastic Surgery, Office of the Surgeon-General, U. S. Army

THE FACE, MOUTH, JAWS, AND NECK

FREMONT A. CHANDLER, M.D., F.A.C.S.

Professor and Director of the Department of Orthopaedic Surgery, University of Illinois College of Medicine; Senior Attending Orthopaedic Surgeon, St. Luke's Hospital, Chicago

THE ORTHOPEDIC SURGICAL TREATMENT OF SPASTIC PARALYSIS  
AND ANTERIOR POLIOMYELITIS

MICHAEL E. DEBAKEY, M.D., F.A.C.S.

Professor of Surgery and Chairman of the Department, Baylor University College of Medicine; Surgeon-in-Chief, Jefferson Davis Hospital, Houston, Texas

ACUTE VASCULAR INJURIES  
SURGICAL TREATMENT OF ANEURYSMS AND OCCLUSIVE DISEASE OF THE ABDOMINAL AORTA  
VARICOSE VEINS AND VENOUS THROMBOSIS

FRANK D. DICKSON, M.D., F.A.C.S.

Clinical Professor Emeritus of Surgery, University of Kansas School of Medicine; Orthopaedic Surgeon, St. Luke's Hospital, Providence Hospital, Consulting Orthopaedic Surgeon, Kansas City General Hospital

HEMATOGENOUS OSTEOMYELITIS

JOHN MICHAEL DORSEY, M.D., F.A.C.S.

Professor of Surgery, Northwestern University Medical School; Chief of Surgery, Evanston Hospital, Evanston, Illinois

THORACIC WALL, PLEURAL CAVITY, LUNGS AND DIAPHRAGMATIC HERNIA

DANIEL C. ELKIN, M.D., F.A.C.S.

Whitehead Professor Emeritus of Surgery, Emory University; Surgeon-in-Chief Emeritus, Emory University Hospital, Atlanta, Georgia

TRAUMATIC ANEURYSM AND ARTERIOVENOUS FISTULA

HANS C. ENGELL, M.D.

Assistant Surgeon, University Hospital of Copenhagen, Denmark

CONGENITAL MALFORMATIONS OF THE HEART AND GREAT VESSELS  
CARDIAC SEPTAL DEFECTS AND OPEN CARDIOTOMY  
HYPOTHERMIA AND THE HEART-LUNG MACHINE

JOHN H. GIBBON, JR., M.D., F.A.C.S.

Professor of Surgery, The Jefferson Medical College; Attending Surgeon, The Jefferson Medical College Hospital, Philadelphia

CONGENITAL MALFORMATIONS OF THE HEART AND GREAT VESSELS  
CARDIAC SEPTAL DEFECTS AND OPEN CARDIOTOMY  
HYPOTHERMIA AND THE HEART-LUNG MACHINE

PAUL W. GREELEY, M.D., F.A.C.S.

Clinical Professor of Surgery and Head of Division of Plastic Surgery, University of Illinois College of Medicine; Senior Attending Plastic Surgeon, Illinois Research and Educational Hospitals, St. Luke's Hospital, Chicago

PLASTIC SURGERY

ELLIS W. JONES, JR., M.D.

Attending Physician, Children's Hospital, Los Angeles; Attending Surgeon, Orthopedic Surgery, Los Angeles County General Hospital, Rancho Los Amigos, Poliomyelitis Respiratory Center, Hondo; Staff, Collis P. and Howard Huntington Memorial Hospital, Alta Vista Hospital, St. Luke's Hospital, Pasadena Dispensary, California Hospital, California Babies and Children's Hospital, Los Angeles

SURGICAL APPROACHES TO THE JOINTS

JOHN C. JONES, M.D., F.A.C.S.

Clinical Professor of Surgery, University of Southern California School of Medicine; Chief, Thoracic Surgery, Los Angeles County Hospital, Visiting Surgeon, Children's Hospital, Hospital of the Good Samaritan, St. Vincent's Hospital, Consultant in Thoracic Surgery, Veterans Administration Hospitals, Santa Fe Hospital, Good Hope Medical Foundation, Los Angeles

INTRACARDIAC SURGERY FOR ACQUIRED VALVULAR HEART DISEASE

J. ALBERT KEY, B.S., M.D., F.A.C.S.

Clinical Professor of Orthopedic Surgery, Washington University School of Medicine; Associate Surgeon, Barnes Hospital, St. Louis Children's Hospital, Jewish Hospital, City Hospital, St. Louis

FRACTURES

LOREN J. LARSEN, M.D.

Assistant Clinical Professor of Orthopaedic Surgery, University of California Medical School; Associate Surgeon, Shriner's Hospital for Crippled Children, Visiting Orthopaedic Surgeon, Children's Hospital, Franklin Hospital, Assistant Visiting Orthopaedic Surgeon, San Francisco City and County Hospital, San Francisco

SURGICAL APPROACHES TO THE JOINTS

DONALD B. LUCAS, M.D.

Assistant Professor of Orthopaedic Surgery, University of California Medical School; Associate Visiting Orthopaedist, Herbert C. Moffitt Hospital, University of California Hospital, San Francisco

SURGICAL APPROACHES TO THE JOINTS

FRANK McDOWELL, M.D., F.A.C.S.

Associate Professor of Clinical Surgery, Washington University School of Medicine; Consulting Surgeon, Frisco Hospital, Missouri Pacific Hospital, Missouri Baptist Hospital, Surgical Staff, Barnes Hospital, St. Louis Children's Hospital, De Paul Hospital, St. Louis

THE FACE, MOUTH, JAWS, AND NECK

WILLIAM F. MEACHAM, M.D., F.A.C.S.

Professor of Neurological Surgery, Vanderbilt University School of Medicine; Consultant in Neurosurgery, Thayer Veterans Administration Hospital, Attending Neurosurgeon, St. Thomas Hospital, Mid-State Baptist Hospital, Consultant in Neurological Surgery, Fort Campbell Station Hospital, Nashville, Tennessee

THE SPINAL CORD

## Authors

JOE VINCENT MEIGS, M.D., F.A.C.S.

Clinical Professor of Gynecology, Harvard Medical School; Consulting Visiting Surgeon, Massachusetts General Hospital, Consulting Gynecologist, Vincent Memorial Hospital, Boston

GYNECOLOGIC SURGERY

BERT W. MEYER, M.D., F.A.C.S.

Assistant Professor, Thoracic Surgery, University of Southern California School of Medicine; Visiting Surgeon, Children's Hospital, Hospital of the Good Samaritan, Consultant, Veterans Administration Hospital, Los Angeles

INTRACARDIAC SURGERY FOR ACQUIRED VALVULAR HEART DISEASE

HOWARD C. NAFFZIGER, M.S., M.D., F.A.C.S., F.R.C.S. (hon)

Professor and Chairman of the Department of Neurological Surgery, University of California Medical School; Surgeon-in-Chief, University of California Hospital, San Francisco

SCALP, CRANIUM, AND BRAIN

LANGDON PARSONS, M.D., F.A.C.S.

Professor of Gynecology, Boston University School of Medicine; Chief, Department of Obstetrics and Gynecology, Massachusetts Memorial Hospitals, Boston

GYNECOLOGIC SURGERY

COBB PILCHER, M.D., F.A.C.S.

Associate Professor of Surgery, Vanderbilt University School of Medicine; Visiting Surgeon, Vanderbilt University Hospital, Nashville, Tennessee

THE SPINAL CORD

BRONSON S. RAY, M.D., F.A.C.S.

Professor of Clinical Surgery (Neurosurgery), Cornell University Medical College; Chief, Department of Neurosurgery, The New York Hospital, New York

LESIONS OF THE CRANIAL NERVES

DALTON K. ROSE, M.D., F.A.C.S.

Professor Emeritus of Clinical Genito-Urinary Surgery, Washington University School of Medicine; Associate Surgeon, Barnes Hospital, St. Louis Children's Hospital, Consulting Staff (Urology), St. Luke's Hospital, Consultant in Urology, St. Louis City Hospital, Medical Staff, Jewish Hospital, St. Louis

THE MALE GENITOURINARY SYSTEM

JOHN B. DE C. M. SAUNDERS, M.B., F.R.C.S.

Professor of Anatomy, University of California Medical School; Consultant, University of California Hospital, San Francisco

SURGICAL APPROACHES TO THE JOINTS



**REGINALD H. SMITHWICK, M.D., F.A.C.S.**

Professor of Surgery, Boston University School of Medicine; Surgeon-in-Chief,  
Massachusetts Memorial Hospitals, Member, Board of Consultation,  
Massachusetts General Hospital, Boston

**THE AUTONOMIC NERVOUS SYSTEM**

**R. GLEN SPURLING, M.D., F.A.C.S.**

Professor and Chief of Section on Neurosurgery, University of Louisville School  
of Medicine, Louisville, Kentucky

**PERIPHERAL NERVES**

**NATHAN A. WOMACK, M.D.**

Professor of Surgery, University of North Carolina School of Medicine,  
Chapel Hill, North Carolina

**THE SURGERY OF PORTAL HYPERTENSION**

## Preface

This volume is devoted to the surgical specialties, although they are admittedly difficult to define and often overlap general surgery. In spite of the fact that the medical profession has for years been trying to curb the tendency toward specialization, this trend has progressed. Nevertheless, we must admit that progress is much more rapid when the individual worker devotes his entire time to the field under investigation rather than dissipates his time and energy in numerous fields which may not be related. Fortunately, the policy of having the specialist in training spend some time in general surgery, and vice versa, is gaining favor during recent years; it is nevertheless true that after completion of their training, surgeons in the two fields for the most part revert in practice to their original calling. Even those who make a special appeal to avoid specialism seem to be specialists themselves. Unfortunately, this specialism cannot be avoided if the surgical profession is to develop talent of the highest type, because the surgical field is becoming too broad for any one man to become proficient in more than one or two of its branches.

In spite of the inability to prevent specialism we should nevertheless insist that in his training period the specialist should have a significant exposure to general surgery and the general surgeon should have training in more than one or two specialties.

In this volume are included cardiovascular, thoracic, orthopedic, neurologic, plastic gynecologic and urologic surgery; ophthalmology and otolaryngology have been omitted largely because these two specialties are less distinctly related to general surgery than those included. The greatest change has been made in the massive enlargement of the material on cardiovascular surgery. In the few years lapsing since the first edition, that specialty has developed tremendously. We have reason to believe it will develop just as spectacularly during the next few years. With few exceptions, improvements and revisions in all chapters have been extensive. The number of illustrations has been increased markedly.

As in the first edition, we have presented herein pertinent data on indications for operation, pre- and postoperative care, results, and so forth, in order to maintain a balance of information. We have long since learned that perfection in technic alone does not make a surgeon. A knowledge of surgical physiology and other basic sciences is essential for good care.

The editor wishes to thank the various contributing authors for their splendid contributions and for their excellent cooperation. The most valuable suggestions made by numerous surgical friends are hereby acknowledged. The untiring effort of Miss Annabel Wheeler in the preparation of the text is likewise acknowledged. At all times the publishers have been most helpful and cooperative.

WARREN H. COLE

# Introduction

Doctor Cole's accomplishments as a general surgeon, now recognized throughout this and other countries, as well as his experience in contributing to surgical literature and in editing a textbook on general surgery, are a guarantee of the highest standards in a text on the operative technic in specialty surgery. Of the greatest importance is the choice of contributing authors in the specialties. In this, Doctor Cole has been most successful; he has chosen recognized leaders, well known for their skill as operating surgeons—surgeons who have had previous training in general surgery. This is especially evident in the chapters on the operative treatment of fractures, the neurosurgical procedures, and in the radical surgery for carcinoma in gynecological patients.

A serious fault of so many of the older books on operative surgery has been carefully avoided in this text. There are no discussions or illustrations of obsolete and discarded procedures that occupy so much space in many texts on operative surgery. Chosen for his known accomplishments and recent contributions to the technic of the various fields, each author gives in detailed fashion a clear description of the procedure he has found to be most effective for each lesion.

In the chapter on plastic surgery, I was most interested in the emphasis placed on the basic and sound principles of wound healing and tissue repair. It is a relief to see so much space devoted to immediate débridement and plastic repair of soft part wounds, especially of the face and hands, and so little space given to the repair of nasal deformities.

In the chapter on thoracic surgery, precautions and pitfalls relating to the various operative procedures are discussed in a clear and arresting fashion—an excellent addition to the detailed discussion of the steps and technics of the operations described.

The most recent advances that have been made in surgery have been in the field of cardiovascular operations. The indications for and the technics of these operations have been very largely determined by the younger generation of American surgeons and the desire for training with them has become increasingly evident in the last three or four years as shown in the number of foreign surgeons desiring graduate training in this field. Doctor Cole has been very wise and fortunate in his choice of men to discuss surgery of the heart and of the blood vessels. One of the very interesting developments in the last two or three years has been the use of plastic material which can be measured and cut and patterned for replacement in resected areas of arteries and veins. In fact, some surgeons at the present time use them in preference to preserved vascular grafts.

Few surgical treatises give so valuable and detailed information on operative procedures in the field of the locomotor and skeletal systems. Due consideration has been given to the increasing use of open operations in the treatment of fractures, with sound analysis of indications for these procedures and the technics to be used.

The material on neurosurgery, including the central nervous system,

the peripheral nerves and the autonomic nervous system, could be a monograph in itself for the contributors are well known authorities in these fields. Certainly it is evident after reading these sections that a thorough knowledge of neurology is as essential as experience in the technics of general and neurological surgery for anyone attempting this kind of operative work.

The radical surgery for cancer is gaining more recognition throughout this country. But equally well appreciated is the fact that those carrying out these very radical procedures must be surgeons with wide experience in general surgery. This is well illustrated in the radical procedures for carcinoma of the uterus—extensive *en masse* resection of the iliac and pelvic lymph nodes—and for women with localized spread to the bladder—a cystectomy with ureterosigmoidostomy. Gynecologists and urologists without general surgical training hesitate to transplant ureters into the colon and compromise with cutaneous ureterostomies, or incomplete resections of the bladder.

For one writing an introduction to this volume, the most interesting features are the choice of the contributors, the emphasis on the part of each to give in detail the procedure and technic for each lesion which, in his own experience, has given the best results and, finally, the evidence in many of the chapters of the importance of training and experience in general surgery before undertaking the surgery of the specialities.

ALLEN O. WHIPPLE



# CONTENTS

PREFACE . . . . .	xiii
INTRODUCTION . . . . .	xxiii
ALLEN O. WHIPPLE	
1. THE BLOOD VESSELS . . . . .	1
I. ACUTE VASCULAR INJURIES . . . . .	1
MICHAEL E. DeBAKEY	
Supplemental Therapeutic Measures . . . . .	2
Surgical Therapy . . . . .	3
II. TRAUMATIC ANEURYSM AND ARTERIOVENOUS FISTULA . . . . .	10
DANIEL ELKIN	
Operative Treatment of Arteriovenous Fistula . . . . .	11
Operative Treatment of Arterial Aneurysms . . . . .	16
Anesthesia . . . . .	19
III. ANEURYSM OF THE AORTA . . . . .	20
HENRY T. BAHNSON	
Thoracic Aneurysm . . . . .	23
Abdominal Aneurysm . . . . .	27
IV. SURGICAL TREATMENT OF ANEURYSMS AND OCCLUSIVE DISEASE OF THE ABDOMINAL AORTA . . . . .	30
MICHAEL E. DeBAKEY	
Aneurysm . . . . .	30
Thrombo-obliterative Disease . . . . .	37
V. VARICOSE VEINS AND VENOUS THROMBOSIS . . . . .	48
MICHAEL E. DeBAKEY	
Varicose Veins . . . . .	48
Injection Treatment . . . . .	49
Operative Treatment . . . . .	51
Venous Thrombosis . . . . .	57
Prophylactic Therapy . . . . .	59
Active Therapy . . . . .	60
2. THE HEART AND PERICARDIUM EXCLUDING CONGENITAL AND VALVULAR LESIONS . . . . .	73
CLAUDE S. BECK	
Cardiac Arrest and Resuscitation . . . . .	73
Pressures on Heart . . . . .	80
Penetrating Wounds . . . . .	83
Incision . . . . .	85
Repair of Ventricular Wounds . . . . .	87
Repair of Auricular Wounds . . . . .	91
Crush and Other Nonpenetrating Injuries . . . . .	92
Foreign Bodies . . . . .	94
Operative Removal . . . . .	95
Purulent Pericarditis . . . . .	95
Pericardiostomy . . . . .	96
Compression Scars . . . . .	96
Incision . . . . .	98

Pericardial Effusions: Sterile, Hemorrhagic, Tuberculous, Neoplastic	104
Pericardiectomy	104
Adhesions	105
Aneurysm	106
Operations for Coronary Artery Disease	107
Beck I Operation	109
Beck II Operation	110
Fauteaux Operation	113
Vineberg Operation	113
Thompson Operation	114
Pulmonary Embolectomy	114
Tumors of the Heart	115
 3. CONGENITAL MALFORMATION OF THE HEART AND GREAT VESSELS	 119
JOHN H. GIBBON, JR. AND HANS C. ENGELL	
Thoracotomy	120
Patent Ductus Arteriosus	122
Operative Technic	123
Coarctation of the Aorta	127
Operative Technic	129
Double Aortic Arch	132
Operative Technic	134
Pulmonary Stenosis	135
Isolated Pulmonary Stenosis	136
Valvotomy for Pulmonary Stenosis	137
Dilatation and Infundibular Resection for Infundibular Stenosis	139
Pulmonary Stenosis with Atrial Septal Defect (Morgagni's Syndrome)	142
The Tetralogy of Fallot	142
Blalock-Taussig Operation	144
Potts Operation	149
 4. CARDIAC SEPTAL DEFECTS AND OPEN CARDIOTOMY HYPOTHERMIA AND THE HEART-LUNG MACHINE	 153
JOHN H. GIBBON, JR. AND HANS C. ENGELL	
Atrial Septal Defects	153
Gross's "Well" Technic	154
Bailey's Inversion of Atrial Wall Technic	158
Björk-Søndergaard Purse-String Method	158
Ventricular Septal Defects	159
Open Cardiotomy with Hypothermia	161
Operative Technic	162
Open Cardiotomy with Heart-Lung Machine	163
Operative Procedure	165
 5. INTRACARDIAC SURGERY FOR ACQUIRED VALVULAR HEART DISEASE	 170
JOHN C. JONES AND BERT W. MEYER	
Mitral Stenosis	170
Surgical Management	173
Surgical Technic	174
Other Valve Lesions	180
 6. THE SURGERY OF PORTAL HYPERTENSION	 182
NATHAN A. WOMACK	
Technic of Portal Caval Shunt	186
Splenectomy	187
Gastrectomy and Resection of Distal End of Esophagus	187

7. THORACIC WALL, PLEURAL CAVITY, LUNGS, AND DIAPHRAGMATIC HERNIA . . . . .	193
JOHN M. DORSEY . . . . .	
Thoracentesis . . . . .	193
Tension Pneumothorax . . . . .	199
Hemothorax . . . . .	201
Closed Drainage Treatment of Acute Empyema . . . . .	202
Funnel Chest (Pectus Excavatum) . . . . .	204
Hernia of the Lung . . . . .	206
Open Wounds of the Thorax . . . . .	207
Fracture of Ribs . . . . .	208
Operative Defects . . . . .	209
Infections of the Chest Wall . . . . .	210
Therapeutic Pneumothorax . . . . .	210
Phrenic Nerve Interruption . . . . .	212
Extrapleural Thoracoplasty . . . . .	213
Open Operation for Acute Empyema . . . . .	215
Operations for Chronic Empyema . . . . .	219
Decortication After Hemothorax . . . . .	220
Operations for Lung Abscess . . . . .	220
Pulmonary Resection . . . . .	223
The Bronchial Tree . . . . .	225
The Pulmonary Arteries . . . . .	227
The Pulmonary Veins . . . . .	233
Specific Resections of the Lung . . . . .	237
Postresection Management and Complications . . . . .	249
Surgical Repair of Diaphragmatic Hernia . . . . .	250
Mediastinal Tumors . . . . .	260
Treatment . . . . .	263
8. THE FACE, MOUTH, JAWS, AND NECK . . . . .	266
JAMES BARRETT BROWN AND FRANK McDOWELL . . . . .	
Facial Injuries . . . . .	266
The Treatment of Facial Paralysis . . . . .	277
Treatment of Tumors of the Face . . . . .	281
Repair of Single Cleft Lips . . . . .	288
Repair of Double Cleft Lips . . . . .	300
Closure of Cleft Palate . . . . .	308
Elongation of the Partially Cleft Palate . . . . .	316
Removal of Salivary Duct Stones . . . . .	320
Surgical Treatment of Ranula . . . . .	321
Treatment of Carcinoma of the Mouth . . . . .	324
Treatment of Osteomyelitis of the Jaws . . . . .	326
Removal of Cysts and Tumors of the Jaws . . . . .	327
Neck Operations . . . . .	331
Excision of the Submaxillary Salivary Gland . . . . .	332
Thyroglossal Duct Cysts . . . . .	334
Lateral Cervical Fistulas . . . . .	336
Branchial Cleft Cysts . . . . .	338
Hygromas . . . . .	340
Biopsy of Cervical Lymph Nodes . . . . .	342
Complete Neck Dissection . . . . .	342
Bilateral Upper Neck Dissections . . . . .	357
Drainage of Neck Abscess of Dental Origin . . . . .	358

9. PLASTIC SURGERY . . . . .	360
PAUL W. GREELEY	
Treatment of Fresh Wounds . . . . .	362
Skin Grafts . . . . .	365
Methods of Closure of Surface Defects . . . . .	377
Transplantation of Tissues Other Than Skin . . . . .	381
Management of Common Specific Problems . . . . .	385
Nasal Deformities . . . . .	411
Plastic Surgery of the Breast . . . . .	414
10. FRACTURES . . . . .	419
J. ALBERT KEY	
Principles in the Operative Treatment of Fractures . . . . .	419
The Upper Extremity . . . . .	420
The Lower Extremity . . . . .	436
The Operative Treatment of Compound Fractures . . . . .	472
11. HEMATOGENOUS OSTEOMYELITIS . . . . .	477
FRANK DICKSON	
Osseous Localization . . . . .	479
Clinical Picture . . . . .	481
Laboratory Findings . . . . .	483
X-ray Findings . . . . .	483
Diagnosis . . . . .	484
Prognosis . . . . .	484
Treatment . . . . .	485
Summary . . . . .	503
12. DEFORMITIES AND NEOPLASMS OF THE BONE . . . . .	504
CARL E. BADGLEY	
Deformities of the Bone . . . . .	504
Congenital Deformities . . . . .	506
Secondary Congenital Deformities . . . . .	513
Growth Disturbances Occurring After Birth . . . . .	520
Growth Changes in Adolescence . . . . .	522
Affections of Adult Bone Producing Bone Deformity . . . . .	525
Neoplasms of the Bone . . . . .	528
Benign Tumors . . . . .	531
Malignant Bone Tumors . . . . .	534
13. SURGICAL APPROACHES TO THE JOINTS . . . . .	539
LE ROY C. ABBOTT, LOREN J. LARSEN, ELLIS W. JONES, JR., AND DONALD B. LUCAS with the collaboration of JOHN B. DE C. M. SAUNDERS	
The Shoulder Joint . . . . .	541
The Sternoclavicular Joint . . . . .	541
The Acromioclavicular Joint . . . . .	543
The Scapulohumeral Joint . . . . .	544
The Elbow Joint . . . . .	567
The Wrist Joint and Joints of the Hand . . . . .	579
The Sacroiliac Joint . . . . .	590
The Hip Joint . . . . .	593
The Knee Joint . . . . .	609
Joints of the Ankle and Foot . . . . .	623



14. THE ORTHOPEDIC SURGICAL TREATMENT OF SPASTIC PARALYSIS AND ANTERIOR POLIOMYELITIS . . . . .	639
FREMONT A. CHANDLER	
Spastic Paralysis . . . . .	639
Surgical Treatment of Anterior Poliomyelitis . . . . .	649
15. THE AUTONOMIC NERVOUS SYSTEM . . . . .	666
REGINALD H. SMITHWICK	
Cervical Sympathectomies . . . . .	668
Thoracic and Thoracolumbar Sympathectomies . . . . .	675
Upper Thoracic Sympathectomies . . . . .	675
Transthoracic Approaches to the Sympathetic Nervous System and to the Vagus Nerves . . . . .	688
Lumbar Sympathectomy . . . . .	692
Transperitoneal Approach to the Sympathetic Nervous System and the Vagus Nerves . . . . .	697
Peripheral Sympathectomy . . . . .	702
Paravertebral Sympathetic Block . . . . .	703
16. PERIPHERAL NERVES . . . . .	711
R. GLEN SPURLING	
Upper Extremity . . . . .	711
Lower Extremity . . . . .	713
Indications for Exploration . . . . .	715
Surgical Technic . . . . .	719
Aftercare . . . . .	732
Results . . . . .	732
17. SCALP, CRANIUM, AND BRAIN . . . . .	734
HOWARD A. BROWN AND HOWARD C. NAFFZIGER	
Anatomic Considerations . . . . .	734
Injuries . . . . .	736
Infections . . . . .	755
Tumors of the Skull . . . . .	762
Brain Tumors . . . . .	764
18. THE SPINAL CORD . . . . .	778
COBB PILCHER AND WILLIAM F. MEACHAM	
Surgical Anatomy and Surgical Physiology . . . . .	778
Laminectomy . . . . .	782
Congenital Malformations . . . . .	787
Injuries . . . . .	792
Inflammatory Disorders . . . . .	798
Neoplasms . . . . .	800
The Relief of Intractable Pain . . . . .	806
Miscellaneous Procedures . . . . .	808
19. LESIONS OF THE CRANIAL NERVES . . . . .	810
BRONSON S. RAY	
Trigeminal Nerve . . . . .	810
Alcohol Injection of Branches of the Trigeminal Nerve . . . . .	811
Alcohol Injection of the Gasserian Ganglion . . . . .	811
Avulsion of Supra-orbital and Infra-orbital Nerves . . . . .	811
Rhizotomy: Surgical Interruption of Sensory Root of Trigeminal Nerve . . . . .	812
Tractotomy: Section of the Descending Tract of the Trigeminal Nerve . . . . .	817
Decompression of the Trigeminal Root and Ganglia . . . . .	818