
Bailey & Love's
SHORT
PRACTICE OF
SURGERY

EIGHTEENTH EDITION

RAINS & RITCHIE

LEWIS
LONDON

BAILEY & LOVE'S SHORT PRACTICE OF SURGERY

EIGHTEENTH EDITION

Revised by

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With 1531 illustrations (229 coloured)



LONDON
H. K. LEWIS & Co. Ltd.

1981

<i>First Edition</i>	1932
<i>Second Edition</i>	1935
<i>Reprinted</i>	1935
<i>Third Edition</i>	1936
<i>Reprinted</i>	1937
<i>Fourth Edition</i>	1938
<i>Reprinted</i>	1940
<i>Fifth Edition</i>	1941
<i>Reprinted</i>	1942
<i>Sixth Edition</i>	1943
<i>Reprinted</i>	1944
<i>Seventh Edition</i>	1946
<i>Reprinted</i>	1948
<i>Eighth Edition</i>	1948-9
<i>Ninth Edition</i>	1952
<i>Italian Edition</i>	1952
<i>Turkish Edition</i>	1955
<i>Tenth Edition</i>	1956
<i>Reprinted</i>	1957
<i>Eleventh Edition</i>	1959
<i>Reprinted</i>	1960
<i>Twelfth Edition</i>	1962
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<i>Fifteenth Edition</i>	1971
<i>Reprinted</i>	1972
<i>Sixteenth Edition</i>	1975
<i>Reprinted</i>	1976
<i>Seventeenth Edition</i>	1977
<i>Reprinted</i>	1978
<i>Eighteenth Edition</i>	1981



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1959, 1962, 1965, 1968, 1971, 1975, 1977, 1981

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I.S.B. No. 0 7186 0450 4

PRINTED IN GREAT BRITAIN

FOR H. K. LEWIS AND CO LTD, 136 GOWER STREET, LONDON
BY HAZELL WATSON AND VINEY LTD, AYLESBURY, BUCKS

PREFACE TO EIGHTEENTH EDITION

The pace of advance in our knowledge of surgical pathology and therapy shows no sign of slowing down. If anything during the four years since the last (17th) edition it has increased. It has always been the aim of this book to try to offer a clear, concise and authoritative account of the state of the play at any particular time. Hence we offer this edition of *Short Practice of Surgery*, the 18th to become available during the last 50 years.

New investigative and surgical techniques which have proven their worth are described and several distinguished contributors have joined us in our efforts to maintain the high standards achieved in the past. These are duly recognised by name on pages vi–vii.

Surgical practice is, it would seem to us, becoming slowly but surely more uniform throughout the world. Not all countries, however, are equal in the facilities they can provide for their surgeons. Our aim has been to try to ensure at least that they may all be equally well informed. If this goal is to be reached student and surgeon alike must have available an accurate account of contemporary surgical practice.

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March 1981

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Photographic Illustrations from the Medical Illustration Units of:

Guy's Hospital, London (Charles Engel). Hospital for Sick Children, Great Ormond Street, London (Derek Martin). The Institute of Ophthalmology, London (Dr. Peter Hansell). The Institute of Orthopaedics (Robert J. Whitley). Charing Cross Hospital (Robin Williams). The London Hospital (Ray Ruddick). St. Mary's Hospital, London (Dr. Peter Cardew). United Birmingham Hospitals (Thomas F. Dee).

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Royal College of Surgeons of England, Fig. 18.

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The Editors and Publishers of:

Annals of the Royal College of Surgeons of England, Figs. 74, 75 and 223.

British Journal of Surgery, Figs. 50, 624, 670, 730, 825, 924, 989 and 1071.

British Medical Journal, Figs. 29, 542 and 543.

The Lancet, Fig. 1112.

Proceedings of Staff Meeting, Mayo Clinic, Fig. 1019.

Surgery, Gynecology and Obstetrics, Fig. 701.

International Journal of Leprosy, Fig. 35.

And others as indicated in the text.

SAYINGS OF THE GREAT

Both Hamilton Bailey and McNeill Love, when medical students, served as clerks to Sir Robert Hutchison, 1871-1960, who was Consulting Physician to the London Hospital and President of the Royal College of Physicians. They never tired of quoting his "Medical Litany" which is appropriate for all clinicians, and, perhaps especially, to those who are surgically minded.

"From inability to leave well alone ;
From too much zeal for what is new and
contempt for what is old ;
From putting knowledge before wisdom,
science before art, cleverness before
common sense ;
From treating patients as cases ; and
From making the cure of a disease more
grievous than its endurance,
Good Lord, deliver us."

to which may be added:

"The patient is the centre of the medical universe around which all our works revolve and towards which all our efforts trend." J. B. Murphy, 1857-1916, Professor of Surgery, Northwestern University, Chicago, U.S.A.

"To study the phenomena of disease without books is to sail an uncharted sea, while to study books without patients is not to go to sea at all." Sir William Osler, 1849-1919, Professor of Medicine, Oxford, England.

CONTENTS

	PAGE
PREFACE	V
CHAPTER	
1. WOUND HEALING AND MANAGEMENT	I
2. WAR WOUNDS	10
3. SEPSIS. ANTIMICROBIAL THERAPY. SCARS	17
4. ACUTE INFECTIONS	26
5. CHRONIC SPECIFIC INFECTIONS	37
6. TUMOURS. CYSTS. ULCERS. SINUSES	50
7. HÆMORRHAGE. BLOOD TRANSFUSION. SHOCK	69
8. FLUID, ELECTROLYTE AND ACID-BASE BALANCE. NUTRITION	87
9. SKIN. BURNS. SKIN GRAFTING	112
10. ARTERIES. GANGRENE	135
11. VEINS	175
12. LYMPHATICS AND LYMPH NODES	185
13. THE HAND. HAND INJURIES. THE FOOT	199
14. INFECTIONS OF BONES AND JOINTS	217
15. THE RHEUMATIC DISEASES	233
16. TUMOURS OF BONES AND JOINTS	254
17. CONGENITAL DISEASES OF BONES AND JOINTS	265
18. DISORDERS OF THE GROWING SKELETON	283
19. GENERALISED DISEASES OF BONE	300
20. DISEASES OF MUSCLES, TENDONS AND FASCIÆ	306
21. NEUROLOGICAL DISORDERS AFFECTING THE MUSCULO-SKELETAL SYSTEM	314
22. DISORDERS OF THE FOOT	324
23. INJURIES TO BONE, CARTILAGE, LIGAMENTS AND TENDONS	332
24. INJURIES TO THE UPPER LIMB	353
25. INJURIES TO THE LOWER LIMB	379
26. HEAD (SCALP, SKULL AND BRAIN)	413
27. SPINE	477
28. NERVES	500
29. EYE AND ORBIT	521

CHAPTER

PAGE

30. FACE. LIPS. PALATE. FACIO-MAXILLARY INJURIES	527
31. TEETH AND GUMS. JAWS. NOSE. EAR	539
32. MOUTH. CHEEK. TONGUE	560
33. SALIVARY GLANDS	583
34. NECK	598
35. THYROID GLAND AND THYROGLOSSAL TRACT	612
36. PARATHYROID AND ADRENAL GLANDS	645
37. BREAST	660
38. PHARYNX	688
39. LARYNX	703
40. THORAX	712
41. HEART AND PERICARDIUM	762
42. ŒSOPHAGUS	789
43. STOMACH AND DUODENUM	810
44. SPLEEN	860
45. LIVER	878
46. GALL-BLADDER AND BILE DUCTS	908
47. PANCREAS	938
48. PERITONEUM. OMENTUM. MESENTERY AND RETROPERITONEAL SPACE	966
49. INTESTINES	990
50. INTESTINAL OBSTRUCTION	1029
51. VERMIFORM APPENDIX	1055
52. ANAL CANAL AND RECTUM	1075
53. UMBILICUS AND THE ABDOMINAL WALL (EXCLUDING HERNIA)	1125
54. HERNIA	1133
55. URINARY SYMPTOMS. INVESTIGATION OF THE URINARY TRACT. ANURIA	1160
56. KIDNEYS AND URETERS	1175
57. URINARY BLADDER	1223
58. PROSTATE AND SEMINAL VESICLES	1263
59. URETHRA AND PENIS	1285
60. TESTES AND SCROTUM	1314
61. TRANSPLANTATION	1341
62. THE SURGICAL PATIENT	1348
INDEX	1351

A SHORT PRACTICE OF SURGERY

CHAPTER I

WOUND HEALING AND MANAGEMENT

'Skin is the best dressing'.—Lister

'A wise physician skilled our wounds to heal is more than armies for the common weal'¹.—Homer

FROM the earliest times the healing of wounds has been the central problem in surgical practice (fig. 1). This applies equally to the wounds of warfare and human assault, to the wounds of accidents, and to the wounds which the surgeon makes deliberately in the course of surgical operations. Once made,



From a handbook for army surgeons, in the middle ages.

FIG. 1



FIG. 2.—Today! *'Plus ça change, plus c'est la même chose'* ('The more things change, the more they are the same').—Karr.

the breach in the surface of the body, the skin, exposes the deeper tissues to the danger of bacterial infection (sepsis), and this danger persists until the healing process has restored an intact surface.

WOUND HEALING

Healing by First Intention.—Rapid healing of the wound in all its layers, particularly rapid skin cover, is the ideal objective—the first intention

¹Weal = the general good, the welfare of a country.

Joseph Lister (Lord Lister), 1827–1912. Professor of Surgery, Glasgow, Scotland (1860–1869), Edinburgh (1869–1877), and King's College Hospital, London (1877–1892). He reported on the use of a carbolic dressing to prevent infection in a paper in the *Lancet* in 1867 (p. 22).

Homer, date of birth uncertain between 1050 and 850 B.C., somewhere in Greece. Still regarded as the great epic poet and author of the *'Iliad'* and the *'Odyssey'*.

Jean Baptiste Alphonse Karr, 1808–1890. Journalist, Paris. Sometime editor of *Figaro*. Also a great gardener.

—of the surgeon. Accurate apposition using sutures¹, clips, staples or adhesive tape or film is essential (p. 22).

Alternative methods of wound closure become mandatory in the presence of tissue tension or infection. *Delayed primary suture*, *secondary suture*, and *skin grafting* can be used to provide skin cover.

Healing by Second Intention occurs: 1. When the wound edges are not brought together. 2. When there is skin loss which cannot be repaired. 3. When the wound becomes infected and breaks open, or has to be laid open.



FIG. 3.—Severe facio-maxillary injury. (Rainsford Mowlem F.R.C.S.)

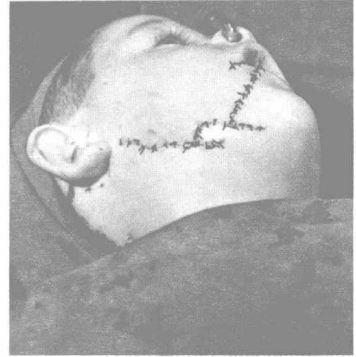


FIG. 4.—Accurate suture for healing by first intention (fig. 5). (Rainsford Mowlem, F.R.C.S.)

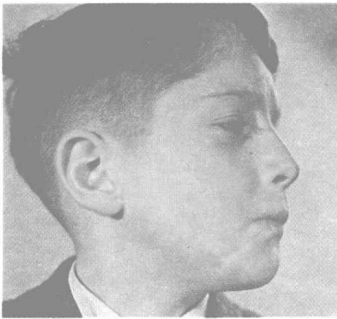


FIG. 5.—See figs. 3 and 4. Healing by first intention.

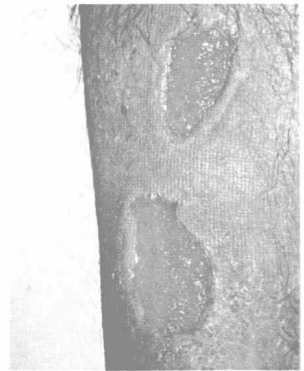


FIG. 6.—Ulcers of the leg healing by second intention.

Healing by second intention is the normal way of healing of an ulcer (fig. 6) or of an abscess after it has been drained.

Healing by second intention is much slower than healing by first intention and invariably involves the laying down of more scar tissue (p. 24). The longer the wound remains raw, the greater will be the amount of scar tissue laid down and the greater will be the contraction and deformity.

¹Suture (Latin) = Sewing together (a stitch). A seam. Ligature (Latin) = Anything that binds together.

Factors Influencing Wound Healing

General State of the Patient.—A debilitated patient, whether due to malnutrition or carcinomatosis, is depleted of resources, and wound healing will often be considerably delayed. Other factors affect the fibroblastic activity of repair, notably uræmia, the use of cytotoxic drugs, the administration of steroids, and Vitamin C deficiency.

Inhibition of wound healing is a feature of the jaundiced patient, the cause unknown. Generalised infection, or a collection of pus somewhere, may delay healing of a wound in another part. It is important under these conditions that any deep sutures in muscle planes should either be of non-absorbable material, or deep tension sutures should be employed, and the skin stitches should be left in longer than usual. When much tissue healing is required, e.g. after an extensive burn, the patient needs a high protein, high calorie diet.

Local Factors.—*A good blood supply* is essential for wound healing. Wounds of the face and hands may bleed profusely but they heal well because of their excellent blood supply. Wounds below the knees, over the shin and calf and below heal badly owing to a relatively poor blood supply.

The presence of tension in the tissues is a major factor in loss of local blood supply and subsequent wound failure. Tension will be increased by dependency of a limb due to venous stasis. A localised hæmatoma is also a common cause of local tissue tension and wound breakdown.

Local infection delays wound healing in several ways. Local tissue tension is increased by the inflammatory response, with an increase in capillary permeability and the collection of pus. The metabolic demands of infection may increase the local demand for oxygen beyond the capability of the blood supply. Tissue necrosis will ensue with subsequent wound breakdown.

Relative arterial insufficiency is often seen in the atherosclerosis patient and is common in the diabetic, the presence of infection often tipping the balance between tissue life and death.

The technique of wound closure is an important iatrogenic cause of wound breakdown. The commonest error is suturing in the presence of tissue tension.

FACTORS AFFECTING WOUND HEALING

<i>General Factors</i>	<i>Local Factors</i>
Age	A poor blood supply due to vascular disease or trauma is unfavourable to wound healing.
Debilitation (Vitamin C deficiency)	Tissue tension kills.
Malignant disease	Local infection delays healing.
Uræmia	Hæmatoma formation is unfavourable.
Jaundice	The technique of wound closure influences repair.
Cytotoxic drugs and steroids	Local x-irradiation delays healing.
Diabetes	
Generalised infection	

Completion of Healing.—Complete healing of a wound takes a long time. The collagen fibres of the uniting scar tissue undergo repeated dis-

ruption and reformation before final maturation. The tensile strength of the wound only approaches that of normal tissue after 6 months, but 100% completion may take as long as 2 years.

Types of Wound and their Closure

It is useful for the correct management of wounds to know the mechanism of injury. In this way it is possible to plan wound exploration and closure in a logical sequence, varying the technique to the type of wound.

Incised Wounds = Primary Suture.—The majority of incised wounds are caused by a sharp knife or glass and are relatively clean. Structures will be damaged only along the track of penetration with minimal tissue injury to structures on either side. After suitable exploration these wounds may be closed by *primary suture*. Damaged tendons, nerves and major blood vessels should be repaired at the time of primary surgery.

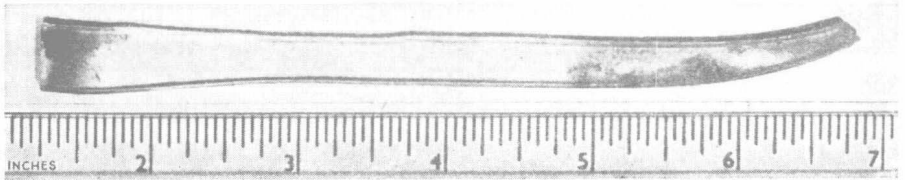


FIG. 7.—Following an air raid a man, aged fifty, walked into an adjacent hospital because of minor facial wounds. He collapsed and died a few minutes later, quite unaware that this slender piece of glass, which was just protruding through the skin, had penetrated three layers of clothing and his abdominal wall. It had severed the middle colic artery.

(Mildmay Mission Hospital, London.)

Penetrating wounds are dangerous (fig. 7). Beware of the innocent-looking stab wound of the abdomen! Not infrequently the long stiletto knife blade has traversed several intraperitoneal viscera. All such wounds must undergo exploration with a view to laparotomy, even in the initial absence of peritonism. Wounds in the thigh are common, especially in the meat trade (butcher's thigh¹). Always look for damage to the neuro-vascular bundle and be prepared to secure proximal and distal control of the major vessel before exploration of the damaged arterial segment.

The razor blade drawn across the front of the wrist several times, as part of a suicidal gesture, usually results in only superficial damage. A more determined effort, with often only one slash, usually severs nerves and tendons on the anterior aspect of the wrist. A lengthy surgical exploration is required.

All these wounds should be closed by primary suture, if possible within six hours of injury. In all cases examine the arterial pulse and nerve supply distal to the injury.

Lacerated Wounds = Wound Excision and Primary Suture of Skin.—These wounds with jagged edges are commonly seen following road traffic accidents. They are frequently dirty and contaminated with organic

¹ Butcher's thigh. Accidental division of the femoral artery caused by the slipping of the boning knife during the preparation of joints of meat (see pp. 69 and 147).

matter. In the presence of devitalised tissue, especially muscle, the risk of infection is increased. The majority of these wounds can be treated by wound exploration and excision with primary closure. The key to success lies in the meticulous removal of all dead tissue, the removal of organic matter such as clothing and irrigation of the raw area prior to a layered closure of the wound. The object is to convert the lacerated wound into one that approximates to an incised wound. Complicated repair of tendons and nerves is not recommended at the time of initial surgery because of the risk of infection. Their repair can wait for 4–6 weeks when good superficial cover can be assured. These wounds should be treated within six hours of injury.

Crushed and Devitalised Wounds = Wound Excision and Delayed Primary Suture.—Industrial and severe road traffic accidents account for the majority of these wounds. War injuries also fall into this group, but as the mechanism of wounding and subsequent management is slightly different they will be considered as a separate entity (Chap. 2).

All major crushing injury is accompanied by a degree of tissue necrosis. The area and depth of devitalised tissue will depend not only upon the area and weight of the crushing force but also on the duration and velocity of impact. Severe crushing injury may have a profound general as well as local effect especially if pressure is unrelieved. Three difficulties exist in this type of wound:

1. It may be impossible with certainty to distinguish between viable and non-viable tissue.
2. Because of the extensive tissue damage great swelling of the tissue may occur. If primary suture is performed the inflammatory oedema and therefore the tissue tension may rise to dangerously high levels resulting in local ischaemia¹ and local death in tissues which were previously viable. Dead muscle is the ideal environment for the development of infection (gas-gangrene).
3. The wound may be heavily contaminated by bacteria.

The key to the management of these wounds is the excision of all dead tissue and the prevention of tissue tension. All necrotic muscle must be removed along with indriven organic matter. Tension beneath the deep fascia must be relieved by a long fasciotomy incision. After irrigation the wound should be left open and dressed. The wound is re-examined 4–6 days later. If it is found that all remaining tissue is viable and the oedema has subsided sufficiently to allow the wound to be sutured without tension, delayed primary suture can be performed. This two-stage procedure is successful for all heavily contaminated wounds, especially in the presence of tissue tension. It is of paramount importance in missile injuries.

So important is it to avoid tension that it may be safer to close the wound by skin grafting even when no skin loss has taken place. When the wound has healed and the tissue tensions have returned to normal the graft can be excised and the skin sutured in the usual way.

If there is any doubt about the advisability of suture—DON'T.

¹ Ischaemia (Greek) = A lack of blood flow.



FIG. 8.

FIG. 9.

FIG. 10.

Figs. 8, 9 and 10.—Wound excision and primary skin grafting.

Wounds with Skin Loss (figs. 8, 9 and 10).—The patient is in danger from superadded infections until the wound has completely healed by re-epithelialisation of the skin surface. Healing of the skin layer is of importance not only in its own right but because the healing of deeper structures, such as the tendons and bones, can only take place satisfactorily in the presence of an intact skin cover. Furthermore, the longer any exposed surface remains raw the greater will be the deformity and disability. In all wounds with skin loss therefore, the skin loss should be repaired as soon as is practicable and as follows:—

1. Clean incised wounds with skin loss—Primary grafting.
2. Lacerated wounds with skin loss—Wound excision and primary grafting.
3. Crushed and devitalised wounds with skin loss—Wound excision and delayed primary, or occasionally secondary grafting. For types of skin-grafting for burns wounds, see p. 131.

Secondary Suture, by freeing skin at the edge of a granulating wound is rarely used. It is easier and safer to perform secondary grafting and to carry out any reconstructive surgery later.

PRACTICAL MANAGEMENT OF THE SEVERELY INJURED

It is probably true to say that simple life-saving first-aid principles account for the saving of more lives than heroic surgery.¹ To save life it is frequently necessary to commence treatment before a definitive diagnosis is made.

¹ The essentials of *First Aid*—attention to the three B's—'Breathing' (airway), 'Bleeding' (Chap. 7) and 'Breaks' (fractures). Beware of and prevent the *second accident*, namely loss of life due to lack of sustained first aid during transport and until handing over to a proper resuscitation team.

1. *Secure the casualty from further injury in the danger zone.* This is particularly applicable on motorways.

2. *Airway.* Ensure an adequate airway, removing blood and debris from the victim's mouth and throat. The use of a good light and mechanical suction are important aids. Maintain and protect the airway by placing the victim in the lateral position, head down, using an oropharyngeal airway if available. In the hands of skilled personnel endotracheal intubation has several advantages in major trauma victims, the airway is secured and protected in addition to providing the facility for artificial ventilation and tracheobronchial suction. The deeply unconscious patient and the severe chest injury associated with a large flail segment benefit greatly by intubation and assisted ventilation. Tracheostomy and cricothyroidostomy are reserved for those cases that cannot be intubated.

3. *Stop hæmorrhage* (Chap. 7). Bleeding can usually be controlled by the application of local pressure using a padded dressing. A tourniquet is sometimes life-saving in traumatic amputation of a limb. Elevate the injured limb.

4. *Relief of tension.* Tension, whether it be intrapleural or intrapericardial must be relieved at once. Venting a tension pneumothorax using a large bore catheter inserted through the second intercostal space about three inches (75 mm) from the midline, and connected to an underwater drain, can be life-saving. Acute cardiac tamponade is difficult to diagnose but, if recognised early, aspiration through a wide-bore needle inserted to the left of the xiphoid process is essential. Relief of acute gastric tension via a nasogastric tube is sometimes necessary.

5. *Secure an intravenous line.* The body compensates so well for blood loss that its response can lull the resuscitation officer into a false sense of security. The estimation of loss of blood is sometimes difficult. Place a large bore cannula into a vein before it collapses due to shock. Perfusion of tissues by an adequate circulation volume is the aim of early resuscitation. Initially a litre of crystalloid (Hartmann's solution) followed by a litre of colloid solution (Dextran 70) can be infused while waiting for cross-matched blood. Only rarely, in the severely exsanguinated, is universal donor O-negative blood infused.

6. *Oxygen administration.* It has been shown that the inhalation of oxygen is of advantage to the major trauma victim.

7. *Splint fractures.* To prevent pain and further damage to soft tissue structures all fractures of the limbs should be splinted.

The Practical Technique of Wound Management

1. Examine the patient for other injuries. Is the patient shocked?
2. Examine the wound. Bleeding and pain often make inspection difficult. Much useful information can be obtained from a brief superficial look at the wound.
3. Have any deep structures been divided by the injury? More complications occur simply because the observer has failed to think about what structures might have been involved than because of any technical short-comings in the operation. Limbs—has a major blood vessel been injured? Examine the peripheral pulse. Has a tendon been involved? Test movement. Has a nerve been involved? Test

movement and sensation. Examine for fractures. The abdomen—has a viscus been involved? If so, which viscus? Examine the urine after catheterisation if necessary. The head—has the skull been damaged or the dura breached with injury to the brain, eye or the ear? (See Head Injuries, Chap. 26.)

Procedure in the Operating Theatre.—Dirty wounds are best initially cleaned in the anaesthetic room with a detergent antiseptic solution, i.e. Cetavlon or Povidone iodine. Once the temporary dressing is removed the wound often bleeds profusely, especially under general anaesthetic. Have an intravenous line in position. A brief inspection of the large wounds enables one to plan surgery before operation. Tattered skin should be trimmed but viable skin must not be excised. If necessary the wound must be extended, preferably in a longitudinal direction, to obtain a good view of underlying tissue. The deep fascia must be freely excised in the presence of tension or haematoma beneath it, in order to open up the muscle compartments. Damaged muscle must be excised until the muscle bleeds freely and contracts when it is cut. Bone is often viable and any fragment should be replaced in position. Foreign bodies should be located and removed. Any tendons, nerves or major blood vessels crossing the wound should be carefully examined to determine if they have been injured or not. In a contaminated wound tendons and nerves should not be sutured at initial operation. If the abdomen, chest or head have been involved by the wound, it must be suitably enlarged so that the deeper parts can be thoroughly examined and any necessary repair carried out. Guide-lines with regard to the management of contaminated wounds and of their skin closure are given in Chap. 2. Any necessary splintage should be applied both to immobilise the fracture and to rest the soft tissues, *even* in the absence of a broken bone.

Antibiotics in the Treatment of Wounds

The most important factor in the avoidance of infection in wounds is careful operative treatment as described above, because if only healthy, well vascularised tissues are left in the wound, the body's defences will be able to deal with all but the most virulent organisms. With extensive wounds with much tissue damage, or if there has been any delay in treatment, systemic antibiotic therapy should be administered. Systemic penicillin over a period of 5 days should be routine, further therapy being dependent upon clinical progress and on the result of bacteriological examination of wound swabs (p. 20). When the gastrointestinal tract is wounded a combination of metronidazole and a cephalosporin or gentamicin is required at the time of assessment and operation (Chap. 3).

Prophylaxis against tetanus is described on p. 31.

Foreign Bodies in the Tissues

In every case of suspected foreign body which is opaque to x-rays, a radiograph must be taken in at least two planes. When removal is attempted, a good light, ample time, proper anaesthesia and a bloodless field are all invaluable together with the use of x-rays in the localisation of the object by means of metal skin markers, needles and in particular an x-ray image intensifier with a T.V. display screen.

Hypodermic needles may break at the neck. The most difficult needle to recover is one situated in the internal pterygoid muscle, which has broken when a dental surgeon has attempted a mandibular block. The glistening tendinous inter-sections in the muscle continually raise the surgeon's hopes, but patience is usually rewarded.

Domestic needles commonly become impacted between the small bones of the hand or foot. The patient may be entirely unaware of their entry. Unless a small