

# Stallard's Eye Surgery

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edited by M. J. ROPER-HALL

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*Sixth edition revised with 781 illustrations*

with a Foreword by J. H. DOBREE



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# Preface

ALL previous editions of this book were prepared and revised by the late Mr H. B. Stallard. The task of making the sixth revision has fallen on me at the request of his colleague Mr John Dobree and of Mrs Gwynneth Stallard, to whom the previous editions were dedicated.

I had the greatest respect for Stallard, as a senior but very approachable colleague, and for his textbook of eye surgery. During my training and many times since I have referred to the previous editions for guidance in the management of surgical problems. Always there was some useful information. The pleasant style and lucid description of technique have been helpful to many surgeons to whom I have spoken. Several of them have commented upon its value as a 'bench book' kept in the operating theatre suite, where it helps nursing staff and assistants when they are unfamiliar with the less common techniques.

One of the delightful features of the earlier editions was the illustrative work of H. B. Stallard. Although several new figures have been introduced and others modified, many of his original drawings have been retained. An attempt has also been made to keep to the same pleasant literary style.

One can remain sympathetic to much of Stallard's opinion. Changes have therefore been made without drastic revision, but only where it was necessary to suit present concepts and practice.

Despite the tendency to further specialism within ophthalmic surgery it is still necessary for the well trained surgeon to have competence in the whole field of eye surgery. There are times when he or she has to perform less familiar procedures. I am acutely aware that surgery is subject to constant advance and a standard text will always have areas that require revision. Nevertheless, many surgical principles remain unchanged and I trust that the reader will use the material in this book as a reliable guide to instrumentation and method, but carefully add proved modifications according to his or her experience.

The text describes methods adopted by many experienced surgeons and those which have an established place in current eye surgery. All chapters have been revised to bring them up to date. Some of the classic procedures have been superseded. They still deserve retention, but their description has been condensed. Modern advances in surgical technique are discussed with special reference to the place of the operating microscope and some recently developed instruments. Fluids which are safe for irrigation during intra-ocular surgery have been specially developed. Their availability varies and further developments are taking place. I have therefore avoided mentioning specific fluids, but have used the term 'physiological solution' to remind each reader of the need to choose a fluid which he is sure is not only sterile but is also the least damaging to the delicate tissues of the eye. Similarly, proprietary names have been avoided and instead the sometimes less familiar British Pharmacopoeial name has been used, followed where appropriate by that of the United States Pharmacopoeia.

There are many different methods of retracting the eyelids to expose the eye for surgery. The last edition suggested the use of lid clamps in many of the operative descriptions. They may still be available, but have not been generally popular and many surgeons prefer to use a light speculum or lid sutures instead. Provided proper exposure is obtained without pressure on the globe, the surgeon's choice is open.

Although the use of new and sophisticated equipment adds precision, I have not forgotten the practical necessity for much eye surgery to be performed by simple methods. Alternative methods are described and the reader should understand the need for this.

Advanced instrumentation may be available only in teaching centres and hospitals with ample resources. Surgeons working in less favourable circumstances are frustrated by the unavailability of such equipment. When resources are limited, the surgeon must depend upon his own dexterity with simple equipment. Those who have never experienced such conditions may be critical of less sophisticated methods and consider them old-fashioned. They should remember that even in the best equipped centres, and in the most advanced countries, equipment may break down or resources become scarce. The ability to use a tried but simple method may then be essential.

I have had the good fortune to travel widely and to observe conditions of work and surgical method in many countries. I am appreciative of all I have learned when visiting and discussing surgery with colleagues at home and abroad. Ophthalmology benefits greatly from a very strong international understanding and goodwill.

As in the previous editions, I have not added a list of references at the end of each chapter, but where relevant have quoted the reference to an author's work within the text.

The previous editions were probably the most widely used texts on eye surgery and have been of great value to surgeons all over the world. It is no longer possible to encompass the whole field in the way Stallard was able to do in the early editions of this textbook because important advances have led to the many sub-specialities. Stallard acknowledged this in the preface to the last edition, when he thanked many colleagues for their help. I repeat thanks to those whose contribution appears again in this volume. There are so many fresh acknowledgements which I have to make, that I decided to record them separately.

I hope that readers of this edition, whether surgeons in training or in established practice, will find it as useful a guide as did their predecessors when reading or referring to earlier editions of this book.

*April, 1980*

M. J. Roper-Hall

# Foreword

J. H. DOBREE M.S., F.R.C.S.  
*Ophthalmic Surgeon Emeritus*  
*St Bartholomew's Hospital, London*

SINCE World War II Stallard's *Eye Surgery* has received world-wide acclaim as a classic of ophthalmic literature. Five editions have up to now appeared, the last being in 1973 not long before the author's death.

Hyla Stallard's gifts as a writer and as an artist are immediately apparent on taking up his book. He was however a modest man and certain aspects of his genius one had to discover for oneself. As one of his former surgical assistants and later as his consultant colleague at St Bartholomew's Hospital for over a decade some account of what I gradually found to be the philosophy of his surgery will perhaps not be inappropriate.

He made himself the master craftsman that he was by constant and painstaking application to his art. Every operation was in itself a research project, carried out as flawlessly as he knew how. He was always seeking a better method. He was inventive and resourceful. Hyla Stallard was no fair-weather surgeon; a case of especial difficulty or a complication during an operation simply increased his concentration and his techniques were even more meticulously adhered to.

It is fortunate that in Michael Roper-Hall further editions of *Eye Surgery* will have guiding hands similar to those of Hyla Stallard. In both there will be found the same mastery of a wide surgical repertoire based, be it noted, on traumatic surgery—a stern master. Stallard's mastery came with the military surgery of the last war. Mr Roper-Hall has gained vast experience at the Birmingham and Midland Eye Hospital, noted for the volume and variety of its accident work, to which he has made so many noteworthy contributions. Like Stallard, he has the same readiness to develop new techniques and, above all, the ability to impart his experience to others.

It is my sincere hope and belief that this and subsequent editions of *Eye Surgery* will continue to instruct, and indeed inspire, future generations of eye surgeons.

## Acknowledgements

IN particular I thank for their advice the following: Mr E. J. Arnott on phako-emulsification, Mr W. H. Bond on radiotherapy and scar hypertrophy, Mr D. P. Choyce on the anterior chamber implant, Mr D. F. Cort on plastic surgery procedures, Mr S. J. Crews on the management of retinal conditions, Professor G. W. Crock on corneal cutting, Professor J. Draeger on the erysiphake and operating microscope, Mr E. Epstein on early intra-ocular lenses, Mr P. Fells for extensive revision on the surgery of extraocular muscles, Dr L. H. Grove for a similar revision on anaesthesia, Mr J. R. Hudson for advice on retinal surgery and aphakic retinal detachment, Mr J. Hunter for some proof corrections, Mr D. McG. Jackson on burns, Dr E. J. L. Lowbury on sterilization methods and control of infection, Professor G. Mackensen on iris suture, Mr H. K. Mehta on biodegradation of implant material, Dr M. McCannel on intraocular sutures, Mr K. Rubinstein on angiography and photo-coagulation, Mr V. H. Smith on orbit and decompression, Mr M. Wake on orbital fractures, Professor S. R. Waltman on keratoplasty and Professor H. Neubauer on foreign body surgery. I am most grateful to Miss Ruth Sowden for advice on the work of the nursing staff and others in the operating suite.

I thank Mr A. Broad, Pharmacist-in-charge at the Birmingham and Midland Eye Hospital, for his help in revising many parts of Chapter 1. The staff of the Medical Illustration departments of the Queen Elizabeth Hospital, the Birmingham and Midland Eye Hospital and the Children's Hospital, especially Mr T. F. Dee and Mr R. Hildreth, who gave valuable assistance in preparing new illustrations.

The President and Council and the Editor of the *Transactions of the Ophthalmological Societies of the United Kingdom*, the Editorial Committee of the *British Journal of Ophthalmology*, Butterworth & Co., Little, Brown & Co., and Appleton-Century-Crofts have kindly given permission to use certain illustrations.

I thank Mr K. Clarke of Ethicon and Mr T. H. Tarbuck of Dixey Instruments for detailed advice and Messrs C. W. Dixey & Son, Down Brothers Ltd, Grieshaber Ltd, Theodore Hamblin Ltd, Keeler Instruments Ltd, Osborne & Simmonds Ltd, Rayner Ltd, John Weiss & Son, Leonhard Klein, Chas. Thackray Mayer & Phelps Ltd, and A. Waeschle for making available illustrations of certain optical and surgical instruments.

I especially thank John Wright & Son Ltd, for their patience and courtesy, and for all their help and encouragement.

I am most grateful to Mrs Paulette Hunter, my medical secretary for many years, for her patient untiring effort in typing and correlating new text, often from untidy handwritten notes. This work was done over several months in addition to her other demanding work. In the final preparation, Miss Veronica Tarr and Miss Pat Quinn gave willing help.

Throughout this time my wife gave me support and encouragement despite the untidy piles of printed material lying about the house and the very irregular hours entailed in my method of revision.

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## INTRODUCTION

### THE EYE SURGEON

*Thou must be like a promontory into the sea, against which, though the waves beat continually, yet it both itself stands, and about it are those swelling waves stilled and quieted.*—MARCUS AURELIUS.

THE qualities of mind and hand necessary to make a good eye surgeon are fundamentally the same as those for the general surgeon. It is very desirable that he should be constantly calm, imperturbable, and patient in all circumstances. Loss of control and the absence of the mental robustness required to stand up to the shock of sudden crisis during the conduct of an operation may lead to disaster. Patience is especially necessary to gain the confidence of a patient during operation under a local anaesthetic and for successful surgical attention in retinal detachment. Haste and impatience often lead to loss of the patient's co-operation. The surgeon must have in his character the qualities of a commander so that he is able to maintain in the operating theatre and wards a high standard of discipline and team work. He must be quite clear about his operative intentions, the difficulties and complications which he is likely to encounter, and the means by which he proposes to deal with these. It is often worth making notes of these intentions and expected difficulties before starting an operation. Unless care is taken in this matter the smooth conduct of an operation may be broken and hesitation prove fatal to the result. Nothing must be left to chance. Resourcefulness in eye surgery generally belongs to pre-operative planning and should seldom become a sudden necessity during operation. Appropriate action in the adversity of postoperative complications must be taken without hesitation or temporizing, for by indecision, delay, and wishful hoping, a situation, often at first remediable by prompt surgical action, may become irremediable. The surgeon's judgement must be soundly based on thorough clinical and pathological training. Judgement is also the product of wide professional and general experience, of deliberation about the reason for past successes and disasters, and to some extent personal intuition plays a part. Good judgement is an individual quality which is more hardly gained by some surgeons than others. It should improve with maturity.

Sir Robert Hutchison has written: '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, service 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.' Besides possessing technical skill of a high degree, a surgeon's integrity should be absolute and unshakeable. He should be constantly modest, discreet, and have moral strength tough enough to withstand the scorching limelight of unsought and undesired publicity.

It is essential for the eye surgeon to have high visual acuity and it is also very desirable for him to have good binocular vision. His hands must be steady. His dexterity may be cultivated by practice. The dissection of anatomical specimens with the less trained hand (generally the left), cutting hairs on the opposite forearm individually with scissors, and removing small foreign bodies impacted in the cornea of a dead animal's eye afford useful exercises for this purpose. Ambidexterity

or the ability to do similar surgical manoeuvres with either hand is, however, not essential. Some instruments are used better in one hand than the other. In surgery, as in art and other crafts, technique is an expression of the operator's personality. The surgeon must adopt the technique which he feels in his hands is the safest and the best for his patient.

Every manipulation during operation must be purposeful, accurate, precise, and finished. Unnecessary movements must be eliminated. There should be no 'touching-up'. Absolute attention to technical detail is essential. The margin between success and disaster in eye surgery is so small. A skilful operation should look simple and easy.

The training of the eye surgeon must be founded on wide clinical experience, and it is essential that he should have a sound knowledge of anatomy, histology, and ocular pathology, the latter acquired by the study of a considerable amount of laboratory material. It is very desirable that he should serve as a house-surgeon (intern) and assistant to a well-recognized surgical 'master', and that he should enrich this experience by watching other surgeons in his own country and by travelling abroad to see work in other clinics. From such visits some useful technical details may be culled. In many crafts there are small points in the craftsman's technique which bear an individual quality, and such is also the case in surgery. When the young surgeon has thoroughly mastered the fundamental principles he may build up by trial, elimination, and acceptance his own technical practices which by experience he has found purposeful and useful. It is of great value to keep a surgical diary in which to make the most honest and searching comments about the conduct of operations, criticizing with particular care the failures, setting out reasons for these and suggestions for prevention should such circumstances occur again. It is also helpful to have the valued opinion of a colleague. Even in eye surgery the onlooker sometimes sees more of the game.

A specialist in any branch of medicine may find himself becoming isolated and detached from the main body with which it is his duty to keep contact. A number of advances in pathology and therapeutics has originated in some other department of medicine and has had some practical application to ophthalmology. So the eye surgeon must keep abreast of advances in general medicine and surgery. Sulphonamide, antibiotic, and cortisone therapy and the treatment of burns are examples of the need for this. He must watch the plastic surgeon at work. Such work in the eyelids and orbit is the legitimate field of the eye surgeon provided he has the aptitude for it. As some ocular problems or complications may coexist in such cases it is, I think, desirable that the eye surgeon who is competent to do this work should have absolute control.

It is also desirable for the eye surgeon to interest himself in neurology, neurosurgery, and nasal surgery. These are boundary zones where surgical work overlaps and it is necessary to have co-operation. A knowledge of the work of other surgeons in these regions is of great importance in the proper management of a patient and any complications which may arise. The eye surgeon must be capable of dealing in a conservative manner with any nasal sinus complication which he may come upon unexpectedly in the surgery of the lacrimal sac or in dealing with an orbital abscess. In emergency surgery, if the services of the neurosurgeon are not available, he must be prepared to close defects in the dura mater by a fascia lata graft, and also to do any conservative plastic surgical work on the face necessary to lay as satisfactory a foundation as possible for the work of the plastic surgeon.

The selection of instruments and materials is a matter of constant trial. As a

general principle it is best that these should be few and simple, well tried, and maintained in perfect condition. With experience certain types and individual modifications of design are preferred. Standard patterns are not necessarily appreciated any more than some such tools would be acceptable to the expert carpenter, and so it is proper to indulge some personal choice in this matter.

Training in operative work must be graduated. It is to begin with extra-ocular operations. Examples would be excision of the eye, removal of corneal foreign bodies, minor surgery of the conjunctiva and eyelids, injection of local anaesthetic, and strabismus. Then after adequate experience to proceed to selected parts of intra-ocular operations; preparatory surgical incision, preplacing sutures, iridectomy or iridotomy, accurate wound closure. Primary surgical repair of trauma, glaucoma operations, cataract extraction, retinal detachment surgery, dacryocystorhinostomy, electromagnet extraction of an intraocular foreign body, plastic work and surgical operations on the orbit should be left until the technique of the simpler operations has been mastered. It is the responsibility of the teaching surgeon to be with his pupil when the latter operates and to continue to do so until he is proficient. It is neither fair to the patient nor to the beginner to leave him to operate alone.

### THE ASSISTANT

In eye surgery, perhaps more than in any other branch, the character and quality of an assistant matter considerably. There is little for him to do in most eye operations compared with general surgery, but it is the manner in which he does this and his behaviour that are so important to the smooth conduct of an eye operation, the morale of the patient under local anaesthesia, and the discipline of the operating theatre staff. He must have a sound knowledge of technique, in particular that of the surgeon he is assisting. He must anticipate every step in the operation. It should be unnecessary for the surgeon to speak to him during the operation unless some change of plan has to be undertaken. He must do whatever is essential and nothing more. There must be neither unnecessary interference nor any attempt to perform outside the province of his duties. He must keep out of the surgeon's way, remain still and quiet, and be patient. Loyalty, tact and pleasant manners contribute much towards creating a sound team spirit and making a happy relationship based on trust and confidence. Such an assistant relieves the surgeon of much anxiety.

The insubordinate, noisy, restless, impatient, interfering and disloyal type is best dispensed with straightaway, for he will upset everyone in the theatre.

A well-trained sister or staff nurse can be an excellent assistant. In all major eye operations her presence as an extra assistant in charge of instruments is valuable for the conservation of time and the maintenance of order among the instruments. The same qualities laid down above for an assistant also apply to her.

## ADMINISTRATION OF THE OPERATING THEATRE

### 1. CLOTHING OF THEATRE STAFF

All staff must change into comfortable lightweight cotton clothing, trouser suits without buttons or 'turn-ups' are preferable with the alternative of dresses for the women. Disposable, non-woven clothing is available but expensive.

Caps and masks must be worn. There are many makes of disposable caps and filtering masks, but caps can be of cotton. All hair must be covered; there are various designs including hoods for men with long hair and beards.

Special footwear must be worn, preferably clogs or canvas shoes which are easily cleaned.

After 'scrubbing-up', the surgeon, assistant and 'scrubbed nurse' wear disposable or non-disposable pre-packed sterile gowns and disposable gloves.

## 2. THE STAFF

The surgeon must impress upon all staff associated with the operation the fact that their contribution is of great importance to its success and make them appreciate the responsibility of the tasks they do, even if this is just lifting the patient from the table to a trolley. The power to make them realize their share of responsibility and the importance of carrying out the simplest duty conscientiously and well is the essence of leadership. The theatre sister is a co-leader of the team, as responsible as the surgeon for setting standards and maintaining a congenial atmosphere. A spirit of willing co-operation within a framework of strict surgical discipline produces the necessary efficiency, understanding, and happiness so essential for doing good work.

It is desirable that, numerically, the staff should be as small as is compatible with efficiency. A specially trained theatre sister, two nurses, and a reliable, intelligent, and technically able man to act as a theatre orderly are generally sufficient. Super-numeraries are required for cleaning the theatre, for transferring the patient from the table to a trolley, but these latter are never in the theatre during an operation. The theatre staff must know each other's duties and be prepared to interchange these should circumstances, such as illness, necessitate this.

The sister's duties are to supervise the work of the other two subordinates; to take care of the maintenance of instruments, the sterility of operating materials and instruments; the cleaning of the theatre; to effect liaison between the theatre and the wards, the TSSU and CSSD, and other suppliers; and to keep a record book of all operations. Her duties also include the teaching of her staff and responsibility for controlled and other drugs. At most operations she must act as an assistant and hand instruments to the surgeon. One nurse assists the patient, adjusts non-sterile equipment if required to do so, removes soiled instruments for cleaning, summons the trolley bearers at the end of operation, and understudies the sister. Another nurse receives the instruments at the end of operation and attends to their cleaning, storage and maintenance (*see Instruments*, p. 16). The theatre technician or orderly needs to be well drilled in surgical asepsis. He must acquire a sound knowledge of the working of all the major equipment including surgical microscope, cryo and diathermy units, electro-cautery and other electrical instruments, vitrectomy and other mechanical instruments for intra-ocular use, and the lights used to illuminate the field of operation. These he must test constantly and be responsible for maintaining their efficiency. The surgeon must also have knowledge and responsibility in these fields which are becoming increasingly complex. This staff must work well together.

## 3. DISCIPLINE

A high standard of discipline is necessary for the safe conduct of an eye operation. Detailed operation lists should be prepared and distributed in good time. Afterwards, the order of the list should not be changed.

On the patient's arrival in the theatre suite and before anaesthesia is commenced, a careful check of identity, the eye to have surgery, the operative consent and the preoperative preparation must be made. Sterility of instruments and materials must be certain. The slightest infection of an eye can be disastrous to vision. There should be no talking in the theatre except a few necessary directions from the surgeon, and

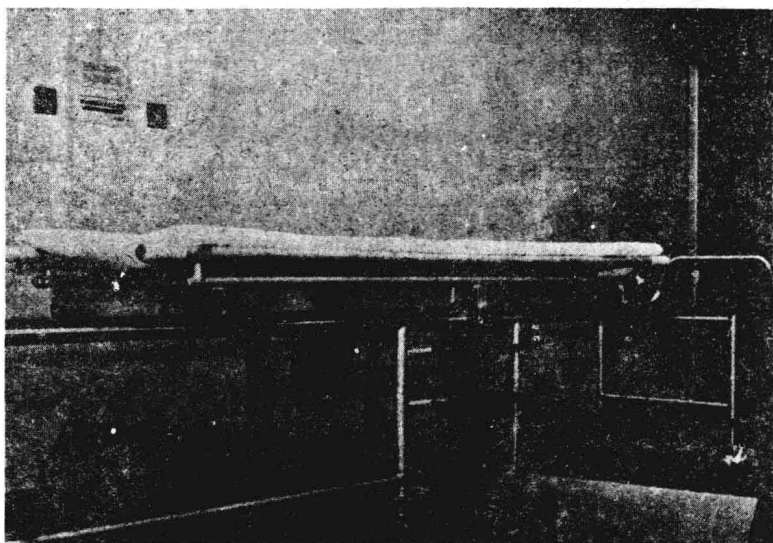
these are uttered into a surgeon's mask. There must be no noise or hurried action in the theatre; indeed, silence has many merits during an operation. Immediately the operation starts, no movement liable to disturb the patient or the operator is made by any of the theatre staff. The doors of the theatre are closed during the operation. When the dressing has been applied, the nurse summons the porters. They are clad in clean linen suits and wear caps and masks. They enter the theatre quietly, and with great care transfer the patient from the operating table to a trolley, thence to the recovery room and later his bed in the ward.

#### 4. VISITORS AND STUDENTS

The ideal is to have no one in the theatre other than the staff. A good arrangement for watching an eye operation is through a glass dome set over the operating table. Around this seats are set and the operation is watched through television screens on the wall of the operating theatre and in the viewing gallery around the dome.

It is undesirable for visitors and students to enter the operating theatre and to crowd round the operator and his assistants as there is a risk of making contact with their elbows and of contaminating the instruments.

Coloured cine-films and video-tapes are of instructional value in showing the main principles of surgical technique and the steps of operations, but they do not convey a correct sense of proportion and touch. They are particularly useful for the instruction of a large class.

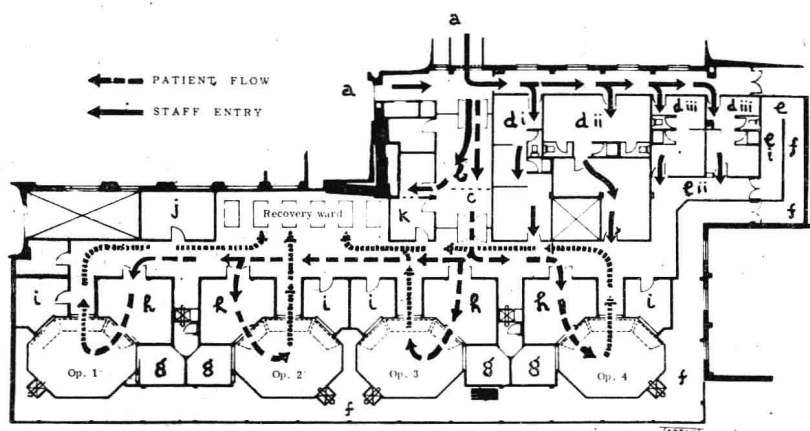


*Fig. 1.1.* Theatre air-lock. Barrier between the wheels of the ward and theatre trolleys. The patient borne on a stretcher is transferred across the barrier on rail runners which connect the two trolleys.

#### 5. LAY-OUT AND DESIGN OF THE THEATRE

The trolley-borne patient enters the theatre area through an air-lock between two sets of automatically operated doors. In the air-lock there is a red barrier across which the ward trolley bearing the patient is engaged with the operating theatre trolley, and the patient is smoothly slid from the one trolley to the other (*Fig. 1.1*)

and moved from the air-lock into the anaesthetic room. *Fig. 1.2* is a plan of the layout of four operating theatre suites. It is based on the following principles. The theatre should be placed in a part of the hospital where it is as remote as possible from extraneous noise and from wards where there are infected patients who provide a risk of an airborne infection. Operating theatres are generally placed high up in the building where airborne bacteria are numerically much less than at ground and lower floor levels. A small octagonal theatre (*Fig. 1.2*) is in some respects more economical of space than either a rectangular or a square theatre, and it has better facilities for manoeuvre of the operating table and trolleys. Only apparatus essential for the operation should be on the theatre floor. Operating lights are suspended from the ceiling (*Fig. 1.12*, p. 15) and anaesthetic gases are delivered through hinged wall brackets above the heads of the theatre team (*Fig. 1.5*, p. 8). The operating microscope and all supplies required for surgery should also come from the ceiling.



*Fig. 1.2.* Plan of the operating theatres at Moorfields Eye Hospital. *a*, Entry from the hospital; *b*, air-lock to theatres; *c*, barrier for transfer of patients from ward to theatre trolley; *d*, changing rooms, (i) surgeons, (ii) nursing staff, (iii) theatre auxiliaries; *e*, instrument department, (i) sterile instruments, (ii) passage for transfer of sterilized instrument trolleys to the theatres; *f*, passage for the collection of soiled instruments from window locks in each theatre (Op. 1, 2, 3, 4); *g*, sterile instrument rooms serving each theatre; *h*, anaesthetic rooms; *i*, surgeon and assistant's wash-up; *j*, light coagulation room; *k*, superintendent's office.

The interrupted black arrow indicates the entry direction of a patient from the barrier across the air-lock to an appropriate anaesthetic room and thence to a theatre. The dotted arrow shows a patient's exit to the recovery ward.

The floor is made of plastic over copper mesh to avoid electrostatic shocks. There should be no direct entry from outside. The surgeon, assistant, sister, nurses, orderly, and visitors pass through 'locks' in which clothes are changed; they put on caps and masks and rubber boots before entering the theatre. The anaesthetist changes in the surgeon's room, and then passes to the anaesthetic room. Washing of hands and forearms is done in an annexe (*Fig. 1.3*) which has an opening into the theatre through an automatically operated door. *Fig. 1.4* shows the control panels for lights, diathermy, and suction.

The sterility of the operating theatre air is of great importance. Air conditioning and filtered air may help to reduce the bacterial content of the air.