T. D. STALLARD

Eye Surgery

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By H. B. STALLARD

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PREFACE TO THE FIFTH EDITION

THE FIFTH EDITION OF THIS BOOK has been extensively revised and much of it has been rewritten. Its original purpose was to describe fully the details of surgical operations which I believe have an accepted place in current practice and not to present an exhaustive literary omnibus which may fail to discriminate about the relative values of certain operations. To this aim I have held in writing the fifth edition. This individualistic manner of writing may not be comprehensive, but I hope that its character and some of its substance will afford a foundation on which the younger surgeons may build the superstructure of their own operative methods.

> So on our heels a fresh perfection treads
> . . . born of us
> And fated to excel us.
>
> KEATS'S *Hyperion*

There is at present a trend in some countries to subdivide the practice of eye surgery. For instance, certain surgeons devote themselves wholly to retinal detachment operations or to corneal transplants. With the possible exceptions of keratomileusis, goniotomy, and the treatment of giant retinal tears, the entire field of eye surgery is, in my opinion, still within the competence of a well-trained and experienced surgeon working in a large clinic.

I thought it proper to include in Chapter Two a description of the treatment of cardiac arrest by both the closed and open methods, for an eye surgeon may have to deal with this emergency. The chapters on reconstructive surgery, corneal grafts, cataract, retinal detachment, the treatment of intra-ocular neoplasms by irradiation, and orbital surgery have been rewritten, and much new material has been added.

Descriptions of new operations—partial cyclectomy, canaliculo-dacryocystorhinostomy, trabeculotomy, trabeculectomy, vitrectomy, phako-emulsification, refractive keratoplasty (keratomileusis), and keratoprosthesis—have been added. Amendments have been made in the technique of other operations.

I have tried to discuss fully the reasons for the techniques that I have found most suitable in various operations and after describing these operations in detail I have commented briefly on alternative procedures and the practice of other surgeons of accepted repute. In re-editing Chapter Three about reconstructive surgery of the eyelids I have omitted the detailed description of war wounds and a number of illustrations of these which were published in the earlier editions, and I have condensed this subject to show by description, selected photographs, and drawings the basic principles of the reparative surgery of war wounds.

Two hundred and eighty-seven new illustrations have been added, and illustrations of the fourth edition have been deleted. I have done all the drawings except four illustrations of canaliculo-dacryocystorhinostomy which Professor Barrie R. Jones has kindly lent me. Some of the illustrations lack artistic finish but I hope

they will serve their purpose. My excuse for not employing a professional artist is that I enjoy the work and believe it to be good training for surgical hands.

Although I have read much, but by no means all, of the literature about eye surgery, for purposes of economy in print and paper I have not added a list of references to each chapter but where relevant have quoted the reference to an author's work immediately following his name in the text.

I thank Mr. A. Lister, Mr. S. J. H. Miller, Mr. J. H. Dobree, Mr. J. E. Cairns, and Mr. N. S. C. Rice for their valued advice about certain glaucoma operations.

I thank Dr. Sheila Anderson, Dr. I. Braddon, and Dr. T. B. Boulton for their helpful criticisms about the section on basal narcosis and general anaesthesia in Chapter Two. To them I express my gratitude for the admirable contributions they have made to the technique of anaesthesia for eye operations and for the patient and skilful manner in which they have met the peculiar needs of this work.

I owe so much to so many for their example and teaching, in particular my chiefs the late Sir John Parsons, Mr. R. Foster Moore, Mr. Rupert Scott, and Mr. R. R. James. I am also appreciative of all I have learned by visiting colleagues in this country and surgeons in clinics abroad, from Dominion, American, and foreign visitors to Moorfields Eye Hospital, and from the comments and criticisms of the house-surgeons with whom I enjoy working. I am most grateful to the nursing sisters—Miss D. W. F. L. Watkins, Miss I. Jones-Ashton, Miss M. Henderson, and Miss G. W. Johnstone—who play and have played a most effective part in my surgical teams at Moorfields Eye Hospital and St. Bartholomew's Hospital and also to Mr. C. Whipp, operating theatre technician.

I thank Dr. Peter Hansell and his staff in the Audio-visual Department at the Institute of Ophthalmology and Mr. W. D. Tredinnick in charge of the Medical Illustration Department at St. Bartholomew's Hospital, for their good work in taking photographs of instruments. Also I am most grateful to Dr. C. W. Graham (late Brigadier, Army Medical Service), to Captain T. Savage and Captain J. E. Coates, R.A.M.C., and to Sergeant Arthur and Corporal McNicol for the photographs of war wounds shown in Chapter Three.

Among those who have kindly lent me illustrations or photographs of instruments are: Mr. D. Ainslie, Dr. D. H. Anthony, Dr. José Barraquer, Dr. H. Buettner, Dr. R. Castroviejo, Mr. D. P. Choyce, Clement Clarke Ltd., Professor J. Draeger, Professor Barrie R. Jones, Mr. L. Fison, Mr. J. Foster, Dr. Charles D. Kelman, Professor H. C. Killey, Mr. Frank Law, Dr. R. Machemer, Dr. D. M. Maurice, Mr. J. C. Mustardé, Professor H. Neubauer, Professor E. Norton, Mr. L. Paufique, Mr. J. S. Phillpotts, Mr. Dermot Pierse, Mr. Harold Ridley, Mr. N. L. Rowe, Mr. J. D. Scott, Dr. D. B. L. Skeggs, Mr. Redmond Smith, Mr. G. P. Sourdille, Mr. A. Stanworth, Mr. W. Martin Walker, Mr. P. G. Watson.

The President and Council of the Ophthalmological Society of the United Kingdom, the Editorial Committee of the *British Journal of Ophthalmology*, the Editor of the *Annals of the Royal College of Surgeons of England*, the Editor of *Transactions of the Ophthalmological Society of the United Kingdom*, the Editor of the *British Journal of Plastic Surgery*, the Editor of the *Practitioner*, Butterworth & Co., and Churchill Livingstone Ltd. have kindly given me permission to use certain blocks.

I am grateful to Mr. A. W. Baker, Chief Pharmacist at Moorfields Eye Hospital, for his advice about the preparation and sterilization of eye drops and ointments.

I thank Messrs. Theodore Hamblin Ltd., Davis Keeler Ltd., Rayner and Keeler, Ltd., C. W. Dixey & Son, Down Bros. and Mayer & Phelps Ltd., John Weiss & Son Ltd., H. K. Lewis & Co. Ltd., Grieshaber Ltd., Oertli Ltd., and Charles Thackray Ltd. for the loan of blocks and electros of certain optical and surgical instruments.

I thank John Wright & Sons Ltd. again for their patience and constant courtesy, and for all the help they have given me.

Lastly I thank my wife for her industry and patience in preparing and typing the manuscript, and for her meticulous proof correcting. Her kindly criticism has been invaluable and her enthusiasm a constant inspiration to me.

August, 1971 H. B. S.

FOREWORD TO THE FIRST EDITION

RECENT ADVANCES IN ANAESTHESIA and in the technique of operations have made it desirable that an up-to-date book on ophthalmic operations should be issued. Past monographs and articles on the subject in the more advanced textbooks have usually enumerated a large number of alternative methods for performing various operations, often with inadequate critical comment. The present volume differs in that it is a record of the methods adopted by an experienced surgeon.

The author has had unrivalled experience as Curator and member of the Honorary Staff of the Moorfields Eye Hospital, as Ophthalmic Surgeon to St. Bartholomew's Hospital, and as Ophthalmic Surgeon in the Army during the War. As Curator at Moorfields he attained a good knowledge of the pathological causes of diseases of the eye—the only sound basis for logical treatment.

There is no better training for a young ophthalmic surgeon than prolonged clinical experience in a large ophthalmic hospital, such as the author has had. He thus gains invaluable experience from the often diverse methods used by a number of the most highly qualified practitioners. At their operations he follows the minutest details of their technique, and often sees more of the progress and results of the cases than even the surgeons themselves. He can therefore select for himself the methods which most appeal to him, and the success of his eclecticism depends upon on his own judgement and technical ability.

In the present volume Mr. Stallard has described his own procedures and the ideals which he has set before him. *Quot homines, tot sententiae*—and it is not to be expected that every ophthalmic surgeon will agree with every detail; but all will agree that the book represents a conscientious endeavour to do the best, and as such must inevitably receive commendation from those most qualified to judge.

Many ophthalmic surgeons, however, are not so fortunately situated as to be able to adopt every detail advocated. Only in the most favourable circumstances are they provided with such expert assistants and nurses, and so complete an armamentarium. None the less, they should study to attain the high ideals presented to them, and so modify their procedures as least to suffer from their own disadvantages.

J. HERBERT PARSONS

"You young men, doctors and scientists of the future, do not let yourselves be tainted by a deprecating and barren scepticism; do not let yourselves be discouraged by the sadness of certain hours which pass over nations. Live in the serene peace of laboratories and libraries. Say to yourselves first: What have I done for my instruction? And as you gradually advance: What have I done for my country?—until the time comes when you may have the immense happiness of thinking that you have contributed in some way to the progress and good of humanity."

Louis Pasteur

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CHAPTER ONE

INTRODUCTORY

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. 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 preoperative 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 reasons 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 perfect vision and it is also very desirable for him to have good binocular vision. His hands must be steady. If he is not naturally ambidextrous this 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 manœuvres 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. Some operators prefer to use always the right hand for making a classic knife section in the extraction of a cataract, standing in front of the patient when the operation is on the left eye.

Every manipulation during operation must be purposeful, accurate, precise, and finished. There must be no unnecessary 'touching-up'. The less done the better. Absolute attention to technical detail is essential. The margin between success and disaster in eye surgery is so small.

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 war surgery, when 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 fancy in this matter.

Training in operative work must be graduated. It is well 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 paracentesis of the anterior chamber, iridectomy, division of synechiae, surgical repair of traumatic iris prolapse. 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 straight away, for such upset everyone in the theatre.

In many eye operations a well-trained sister or staff nurse does all that is necessary adequately and well. 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

Caps and masks are worn by all in the theatre. For comfort the clothing beneath the sterile gown should be of light material such as balloon cloth and loosely fitting to allow unrestricted movements. The aperture for the head and neck is cut square, a blouse without buttons and pyjama trousers for the men and a three-quarter

length dress for the nursing staff. Sterilized half-length rubber boots are worn by the men and canvas shoes by the nursing staff and visitors. The theatre orderlies wear white boiler suits.

2. The staff

The surgeon must impress upon the staff and all subordinates associated with the operation the fact that their contribution is of great importance to the success of the operation 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 impress subordinates, to make them realize their share of responsibility and the importance of carrying out the simplest duty conscientiously and well, is the essense of leadership. The success of a surgical team rests, as in other things in life, with its leader. 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 clean type of man to act as a theatre orderly are generally sufficient. Supernumeraries 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 sterilization of operating materials, drop-bottles, and instruments; the cleaning of the theatre; to effect liaison between the theatre and the wards; and to keep a record book of all operations. At most operations she must act as an assistant and hand instruments to the surgeon. One nurse assists the patient, adjusts an operating lamp 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, working in the theatre suite but outside the operating room, is trained to select the instruments which the surgeon requires. She is responsible for their sterilization under the sister's direction. She collects the instruments at the end of operation and attends to their cleaning, storage, and maintenance (*see* INSTRUMENTS, p. 16). The theatre orderly must acquire a sound mechanical knowledge of the giant electromagnet, the surgical diathermy apparatus, electrolysis, electrocautery, cryo-unit, and the lights used to illuminate the field of operation. These he must test constantly and be responsible for maintaining their efficiency. He is well drilled in surgical asepsis. This staff must work well together.

3. Discipline

A high standard of discipline is necessary for the safe conduct of an eye operation. Sterilization of instruments and materials must be meticulous. The slightest infection of an eye is frequently 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 fine woven lint mask in which is a layer of cellophane. 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 and locked during the operation. When the dressings have 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 and 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, one on the wall of the operating theatre and another 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 are of instructional value in showing the main principles of surgical technique and the steps of operations, but, like television, they do not convey a correct sense of proportion and touch. They are particularly useful for the instruction of a large class.

5. Lay-out and equipment 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

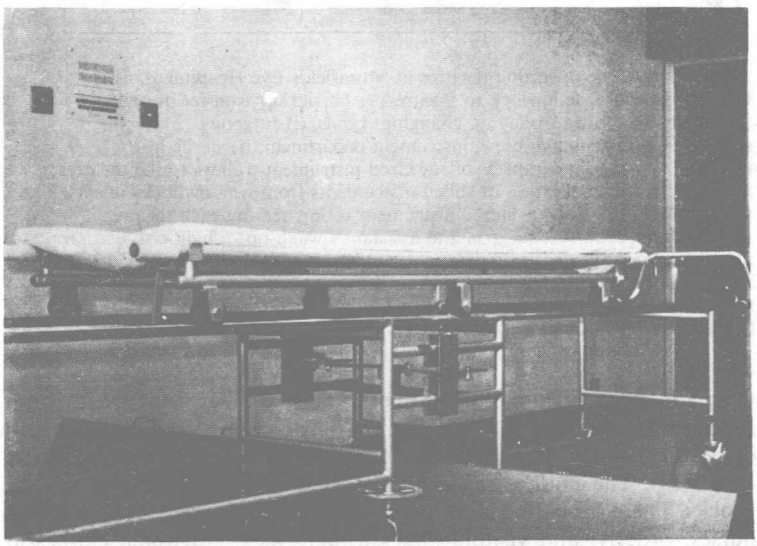

Fig. 1. Theatre air-lock. Barrier between the wheels of the ward and theatre trolleys. The patient borne on a stretcher is transferred across the barrier on rail runners which connect the two trolleys.

which the foot end of the ward trolley bearing the patient is engaged on runners with the operating theatre trolley and the patient is smoothly slid from the one trolley to the other (*Fig.* 1) and moved from the air-lock into the anaesthetic room. *Fig.* 2 is a plan of the lay-out of four operating theatre suites. It is based on the following principles. The theatre should be placed in a wing of the hospital where