CORRESPONDENCE

EYE-RUBBING AND CONTACT LENSES

To the Editorial Committee of the British Journal of Ophthalmology

Sirs,—In 1947 I first noticed a patient, a severe case of keratoconus, indulging in very vigorous eye-rubbing and from that time I have had this in mind. In 1956 (Brit. J. Ophthal., 40, 295), I summarized my experience of 92 cases of keratoconus, but omitted any reference to eye-rubbing as I was not then sure of its significance.

Irritability of the eyes on account of infection, allergic affections, or emotional stress as at school or at puberty, may induce eye-rubbing in anyone and, as a rule, no permanent harm ensues. If, however, the cornea is weakened by coincident or antecedent inflammation or, as is seen so frequently in my experience of keratoconus, it is thin centrally on account of conus posticus then the cornea may give way if subjected to persistent rubbing. It is first distorted and this may give rise to increasing astigmatism: as a rule the angle of the astigmatism is clearly related to the manner of eye-rubbing. Later the cornea stretches and typical keratoconus is produced. It might be thought that the rubbing is coincidental and not causal, but the large proportion of patients giving a history of habitual rubbing before the keratoconus appeared leaves little doubt that eye-rubbing causes the cornea to give way and is also responsible for the progress of the condition. Very rarely indeed a normal cornea insulted by gross and persistent gouging and rubbing may follow the same course; one case actually developed severe hydrops of the corneae. It seems that keratoconus most commonly arises in patients affected by conus posticus who are also eye-rubbers.

To analyse in detail more than 300 cases will take a considerable time and there must be a further delay before publication. It has been put to me that, feeling reasonably certain of these facts as I now do, I ought to draw attention to them as quickly as possible so that patients may be warned against the dangers of eye-rubbing and ophthalmologists may be on the look-out for such cases.

Yours faithfully,

Frederick Ridley.

Moorfields Eye Hospital,
High Holborn,

BOOK REVIEWS


This is a useful book which, while claiming to be an introduction to the ophthalmologist for the study of refraction and visual physiology, contains all, and perhaps even more than all he reasonably requires to know of optical theory. A book of this kind cannot by its nature contain much original thought. The merit of a new work on a subject already standardized in all its essentials can only lie in the method of presentation. The present volume is based on lectures given to ophthalmologists at the Mayo Clinic, and the method of the presentation of the subject fully justifies its publication. The subject is well covered with sections on the nature of the physical characteristics of light, 631
geometrical optics, the theory of prisms and lenses, the optical system of the eye and its aberrations, and the correction of the latter by lenses; the two concluding sections on optical instrumentation and illumination are short and very useful guides to the more practical problems of optics as applied to the clinic and to everyday life. The author is to be complimented on his work and the publishers on its presentation.


In this monograph Desvignes makes a gallant attempt to analyse the rationale of raised intra-ocular pressure. As a result of 25 years of clinical experience he has concluded that the raised tension is the essential deleterious factor in glaucoma. He has therefore analysed the causes of raised tension in all types of secondary glaucoma; and reasoning from the (comparatively) known to the unknown, puts forward a theoretical basis for the aetiology of primary glaucoma. This disease, he concludes, is not primarily due to a local obstruction of the drainage pathways of the aqueous humour, nor to vaso-sclerosis; these, when they are in evidence, constitute secondary phenomena. Initially this condition is due to a disturbance, usually intermittent in its manifestations, of the central mechanism responsible for the regulation of the intra-ocular pressure. At this stage the disease is functional, depending on neuro-endocrine, metabolic, allergic, or psychopathic factors. This period is followed by a second wherein changes of a vascular nature appear in the eye itself, primarily and essentially in the uveal tract involving alterations in the permeability of the capillaries and a state of acute or chronic oedema. In such a condition, of course, miotics are effective through their action on the autonomic system and surgery merely provides symptomatic relief. Put shortly it all sounds very simple.


The first instrument designed to measure ocular tension came into use about a hundred years ago, and Draeger has provided an appropriate celebration of this centenary in the form of a monograph, in which he traces the development of the tonometer from the early simple mechanical devices to the more complex modern instruments.

Digital tonometry is first considered briefly and the earliest ideas for the instrumental determination of ocular tension are described. It would appear that these ideas emerged almost simultaneously in Berlin and in Utrecht; the first instrument which could be properly regarded as an impression tonometer is attributed to von Graefe in 1862, and a similar device developed by Donders appeared in the following year. To-day, one would scarcely think of applying a tonometer to any part of the eye other than the cornea, and it is therefore a little surprising to realise that these instruments were applied to the globe either through the closed lids or to the sclera. The necessity for this method of application becomes apparent when we are reminded that it was not until 1887 that Koller introduced cocaine as a local anaesthetic for the eye.

This advance made the cornea available as a site of application of the tonometer, an advantage which was so ably exploited by Hjalmar Schiötz, whose impression tonometer, the undoubted forerunner of most modern instruments, appeared in 1905. This monograph makes clear how much energy and ingenuity has been expended on the development of a surprising number of tonometers, varying widely in the details of their construction yet departing little from the basic principles introduced by Schiötz. One is left with the feeling that, apart from the so-called electronic tonometers and the recording tonometer of Maurice, there have been few major advances in impression
tonometry. Draeger describes each tonometer adequately, wisely avoiding a profitless account of mechanical details, and he enumerates the advantages and disadvantages of each instrument, although in some cases this must be based to some extent upon conjecture. A minor failing is that there appears to have been no consistent policy with regard to the illustrations; sometimes, no more can be gathered than the general appearance of the tonometer (although this is often interesting), while at other times the primary intention appears to be an explanation of the mechanics involved; unfortunately in some illustrations neither purpose is fully realized so that one is annoyed at being unable to visualize the gross appearance of the instrument and puzzled as to how the device worked.

The section on applanation tonometry follows the same plan, instruments being described in chronological order until the most recent practical refinements, embodied in the applanation tonometer of Goldmann, are reached.

Next the author deals with the influence of so-called ocular or scleral rigidity upon tonometric measurements. An understanding of this matter is essential to a full appreciation of the limited accuracy of tonometry, but it cannot equal the fascination of the instruments themselves. Nevertheless, an attempt is made to deal in an historical manner with these concepts, and on the whole there emerges a lucid exposition of the problems involved. It would perhaps have been advantageous to point out the simple fact that a large source of error in impression tonometry is attributable ultimately to the weight of the instrument, and that, in general, the heavier the tonometer the lower its accuracy.

The monograph ends with a consideration of the standardization of tonometers. The historical review shows that improvements have undoubtedly been made in impression tonometry but any illusion that an ideal state has been reached is dispelled by the statistics quoted by eight centres providing facilities for standardization. According to the majority of these centres, less than 20 per cent. of the tonometers submitted reached the standards required.

This monograph will prove interesting to the many who perform tonometry and to the few who may attempt to devise a new tonometer and desire to profit from the experience of the pioneers.


The fifth edition of Eugene Wolff's Anatomy of the Eye and Orbit has appeared as revised by R. J. Last of the Royal College of Surgeons of England. Wolff's book, written initially in 1933, is well known to readers of this Journal, and the present edition is little changed from its predecessors; indeed, the criticism could well be made that the book is too unchanged and that the advances in our knowledge of ocular anatomy which have been made since 1954 are inadequately presented. The contributions of the electron microscope have been largely omitted. With regard to the retina it is considered that the work done in this respect is still too recent for the significance of the observed appearances to be clear. To some extent that may be true for this tissue (although many of the appearances are worthy of note), but there seems little excuse for describing the structure of the cornea in terms of Virchow, or Bowman's membrane as "structureless", or for speculating whether the lens capsule is composite. Even in terms of microscopic anatomy, recent literature has not by any means been integrated into the text. Despite anatomical and physiological observations which most commentators have accepted as conclusive, it is suggested that no direct communication exists between the anterior chamber and the canal of Schlemm, and, despite the work of Warwick, the classical scheme of the composition of the third cranial nucleus as put forward by Brouwer and Zeeman is retained without question. The basis of the book, however, is good.
BOOK REVIEWS


This book contains a series of papers which formed the basis of a symposium convened to mark the occasion of the VII International Congress of Anatomists in New York in April, 1960. It includes contributions from fifty observers, representing ten nationalities, in the fields of experimental anatomy, physiology, biochemistry, biophysics, and biology. The diverse nature of these contributions emphasizes the unique properties of the eye as a medium for many forms of experimental investigation. For example, the cornea provides a regularly arranged avascular connective tissue which has the unique property of being transparent, the lens provides a homogeneous and distinct tissue which is ideal for immunological studies, the vitreous represents a mucoid connective tissue of a transparent nature, and the retina presents variations in structure which may be correlated with variations in function in different species.

The appearance of the book is timely, because it provides a clear account of the most recent advances in our knowledge of the structure of the tissues of the eye, advances which are largely due to improved methods of examination, such as electron microscopy, which provides an accurate analysis of the most intimate and hitherto unknown details of each individual cell, histochemistry, which gives information about the chemical nature of the ultrastructure of the cell, immunology, which provides precise information of the breakdown of tissue protein into its different entities, and radioautography, which permits a continuous study of the cell during migration. It must be emphasized, of course, that the findings in this book are essentially of an experimental nature so that it is not always possible to measure the significance of these observations in the clinical sphere, but its interest to the clinician lies in the increasing conviction that advances in the realm of clinical ophthalmology depend to a large extent on an increase in knowledge of the fundamental structure and function of the eye.

It is a credit to the editor and to the numerous contributors, including those who took part in the general discussions, that this book has been produced within such a short time of the Meeting. The illustrations are excellent, and each paper contains a comprehensive bibliography.

NOTES

Retina Foundation
Boston, Mass.

Clinical Research Fellowships of the Retina Foundation will be expanded upon completion of the Foundation's research building at the end of 1961. The training programme includes concentrated work in general fundus diagnosis by indirect stereoscopic ophthalmoscopy, and in the surgery of retinal detachment. Many opportunities and special training are available in various phases of clinical research. Details about one-year and two-year programmes will be sent on request. Fellows not supported by other research or training grants receive adequate stipends.

Graduates of medical schools outside the United States and Canada must complete the requirements of the Educational Council for Foreign Medical Graduates to engage in clinical activities.

Inquiries and applications should be addressed to:
Dr. Robert J. Brockhurst, 99 West Cedar Street, Boston 14, Massachusetts.