is only one question, where to make the operation, which part of the ciliary body shall we detach? We decided, referring to the intact part of the iris, at the insertion of the inferior rectus muscles. Next day the pressure was subnormal (12 Hg mm.) and for half a year there has been no alteration in the pressure.

As far as we are concerned we would propose in cases of genuine iris-atrophy combined with high pressure a cyclo dialysis a tergo (secundum Blaskovics) at the insertion of inferior rectus muscle.

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THE DEVELOPMENT OF MEDICAL STUDIES IN BRITAIN: OPHTHALMOLOGY*

BY

R. R. James

Earliest Times

English ophthalmological history may be said to start with the Roman occupation of Britain. From the large number of oculists' stamps which have been unearthed on Roman sites we know that a good deal of local treatment of eye conditions by way of collyria and ointments was practised at this early date. After the withdrawal of the legions there is a long gap in our knowledge; in fact nothing is known until we come to the Anglo-Saxon Leech [medical] books and Herbals. Here again, treatment was mainly by local applications of infusions of herbs and the secretions of animals, such as gall mixed with honey, and even of human urine. Charms also played a large part and we may say that Anglo-Saxon ophthalmology has every appearance of having been largely futile.

The Norman Conquest and after

The Norman Conquest did little to improve the practice of ophthalmology but the 13th century saw the beginnings of optics

in Britain. Grosseteste, Bishop of Lincoln, was the teacher of Roger Bacon (died 1294), who proved that spherical plus spheres would be of use for reading in old people; while John of Peckham (died 1294), later Archbishop of Canterbury, is credited with the discovery of the use of concave refracting surfaces, and his *Perspectiva Communis* was for the next few centuries the only textbook on optics to be used in England.

In the year 1377 John of Arderne wrote his little book entitled *De cura oculorum*, of which manuscripts in Latin and in 15th-century English exist among the Sloane Manuscripts at the British Museum, and in the Library of Emmanuel College, Cambridge. This booklet is a mere compilation of other people's views, much of it being taken from Lanfranc. English ophthalmology had, in fact, made very little progress since Anglo-Saxon times.

The Sixteenth and Seventeenth Centuries

The closing years of the 16th century saw the publication of two small books dealing with ophthalmology. One was Walter Bayley's *Briefe Treatise Touching the Preservation of the Eye-sighte*, and the other a translation (probably by A. Hunton, of Newark-on-Trent) of Guillemeau's *Maladies de l'Œil*.

Early in the 17th century Richard Banister, of Stamford, brought out a duodecimo of 478 pages containing five separate treatises. Of these the first 112 pages are Banister's own contribution, and this section is named Banister's Breviary. Though he was an itinerant oculist it is obvious that Banister was a much more honest practitioner than the rest of his ophthalmic contemporaries. He it was who first pointed out the cardinal sign of hardness of the eyeball in cases of *gutta serena*, in this case glaucoma. The significance of his observation was not recognised, and raised intra-ocular tension was forgotten for the next 150 years. Banister was also almost certainly the author of the manuscript in the British Museum (*Sloane Manuscript, 3801*) which throws much light on the manners and customs of the itinerant charlatans of this date. Several of these are named, such as Luke of Erith, Mr. Surphlete of King's Lynn, and Henry Blackborne. The last-named is severely criticised by Banister, and it is a sign of the looseness of the times that Blackborne in 1605 received the Archbishop of Canterbury's licence to practise in diseases of the eyes. Richard Banister must have been a remarkable man and has deserved well of ophthalmology.

Turberville of Salisbury (died 1696) was a qualified medical man in an age of unqualified quacks. He had a large practice and made a valuable contribution to ophthalmology in extracting an iron particle from the cornea with a magnet. Another qualified English physician of this time was William Briggs, who published the
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Ophthalmographia and the Nova Visionis Theoria. He described the papilla of the optic nerve in 1676 and, in 1684, recorded in the Philosophical Transactions of the Royal Society a case of night-blindness. Dimness of vision following the administration of Peruvian bark in fever was described in 1681 by a general practitioner at King’s Lynn in a letter to Briggs.

The Eighteenth Century: Charlatanism and the Foundations of Modern Ophthalmology

The 18th century was the age of ophthalmic quackery, but it saw the foundations of modern ophthalmology laid by such masters as Cheselden, Sharp and Warner. Cheselden devised the operation of iridotomy in the making of an artificial pupil, and Sharp and Warner perfected the operation of extraction of cataract, a great advance on the age-long method of couching [displacement of the cataract from the visual axis].

Duddell, a pupil of Woolhouse, wrote a good account of diseases of the cornea in 1729. Later in the century, James Ware wrote on syphilis in connexion with ophthalmia, and brought some order out of chaos in the matter of conjunctival diseases. Gataker wrote on the anatomy of the eye and on the use of belladonna, and Wells on double vision.

The chief 18th-century ophthalmic quacks were William Read, Roger Grant, and the Chevalier Taylor. Read and Grant were illiterate; the former was knighted by Queen Anne. The Chevalier Taylor was quite a remarkable person. In professional knowledge he was often far ahead of his time, but he practised all the arts of unblushing effrontery and charlatanism. He was oculist to George II, and his son and grandson followed in his footsteps though they were not of the same calibre. Eighteenth-century Royalty was singularly unfortunate in its oculists, as George Coats pointed out.

The end of the century, in 1794, saw the publication by John Dalton of the history of his colour blindness. Thus, it will be seen that up to the end of the 18th century ophthalmology had not advanced very far, but better times were to come.

Rational Ophthalmology displaces Charlatanism

The year 1805 saw the foundation of Moorfields Eye Hospital by J. C. Saunders, and this more than anything else struck the death blow to the quackery of the previous century. Provincial Eye Hospitals were founded at Exeter in 1808, Bristol in 1810, and Manchester in 1814. The Royal Westminster Ophthalmic Hospital was founded by Guthrie in 1816, the Central London

* Now the Royal London Ophthalmic Hospital.
Ophthalmic Hospital in 1843, the Western Ophthalmic Hospital in 1856 and the Royal Eye Hospital in the year following. The first course of lectures on diseases of the eye was given by Guthrie at the Royal Westminster Ophthalmic Hospital.

An earlier epoch-making date in ophthalmological history is 1801, when Thomas Young published his paper on the mechanism of the human eye in the Philosophical Transactions. He described astigmatism and measured the amount of the astigmatism in his own eye. His table of optical constants has been only very slightly modified by modern research. His theory of colour vision postulated the presence in the retina of three "fibres," which correspond to the colours red, green and violet respectively. This theory was later resuscitated by Helmholtz and is known as the Young-Helmholtz theory. Young's experiments on interference strongly supported the undulatory theory of light already adumbrated by Sir Isaac Newton and Huygens.

Ophthalmological Literature and Societies

The first real text-books of ophthalmology in Britain belong to the first half of this century. In 1830 William Mackenzie of Glasgow brought out his great work on diseases of the eye. It was far ahead of any previous text-book on the subject and it ran to a fourth edition. Mackenzie was a master clinician, and was the first surgeon to give an adequate account of sympathetic ophthalmitis. Sir William Lawrence's text-book appeared in 1833, and Richard Middlemore's in 1835. Before this, Travers had brought out his synopsis of diseases of the eye in 1820. It ran to a third edition. J. C. Saunders published a book before his untimely death, and did much to revolutionise the treatment of congenital cataract by insisting on early discussion. In this he followed the practice of Woolhouse, an English surgeon, who was resident in Paris for many years in the previous century.

Wardrop's Essay on the Morbid Anatomy of the Human Eye laid the foundations of ophthalmic pathology; Tyrrell's Diseases of the Eye, in two volumes, appeared in 1840; and Dalrymple's splendid atlas belongs to about this date.

The year 1881 saw the foundation of the Ophthalmological Society of the United Kingdom with Sir William Bowman as first president. It grew out of informal discussions in the house-surgeon's room at old Moorfields, and of the Committee appointed to make arrangements for its foundation Sir Thomas Barlow was at the time of his death the last survivor. Sir H. Lindo Ferguson of New Zealand is also still with us as an original member of the Society. The Society now has, as affiliated members, the Oxford Congress, founded by R. W. Doyne, the North of England
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Ophthalmological Society, founded by Percival Hay and J. Gray Clegg, the Midland and South Western Societies, the Irish Ophthalmological Society, and the Scottish Ophthalmic Club. A volume of Transactions has been published each year without a break since 1881, and the series forms a rich mine of ophthalmological facts.

In 1857 the staff at Moorfields began the publication of the invaluable Ophthalmic Hospital Reports, which ran to 20 volumes. In 1864 J. Z. Laurence and T. Windsor began the publication of the old Ophthalmic Review. It came to an untimely end 3½ years later and the new Review was started in 1881 by Priestley Smith of Birmingham and Karl Grossmann of Manchester. The Ophthalmoscope was founded by Sydney Stephenson in 1903. In 1917 the first number of the British Journal of Ophthalmology appeared. It incorporates the Moorfields' Reports, the Ophthalmic Review and the Ophthalmoscope, and has continued without a break to the present day.

Ophthalmic Instruments and Operations

English ophthalmic instruments has been responsible for many inventions of ophthalmic instruments. It should not be forgotten that William Porterfield (died 1771) devised the first optometer. Charles Babbage, in 1848, constructed an ophthalmoscope which left little to be desired. He showed it to Wharton Jones, who, alas! did not realize the importance of the means of research thus placed at his disposal. Babbage was a mathematician, not an ophthalmic surgeon, and finding that Wharton Jones was not interested in his model he took no further steps and it was left to Helmholtz to bring out his instrument in 1851. Tyrrell devised the iris hook which bears his name; Bowman a trephine for the eye-ball; Mules of Manchester first suggested the insertion of a glass globe in the sclerotic after evisceration of the eyeball, and his practice was later modified by Frost and Lang, who inserted globes of glass or metal into the orbit.

Corneo-sclerotic trephining for chronic glaucoma was first proposed by Freeland Fergus of Glasgow in 1909. In the next year Elliot, of Madras, improved the operation by splitting the superficial layers of the cornea in order to make more sure of tapping the anterior chamber, and the operation has been known by his name ever since. Herbert, of the Indian Medical Service, also made important additions to our anti-glaucoma methods at this date.

Stanford Morton's ophthalmoscope was for years the best of its kind, though Frost's instrument was a close second. Frost also brought out an extremely effective model eye for teaching purposes.
Ophthalmology as a Speciality

In the early years of the last century ophthalmology was still, in Britain, a part of General Surgery; Sir William Bowman was the first general surgeon to give up his surgical work at King's College Hospital in order to become a pure ophthalmic specialist. With George Critchett, Bowman was responsible for the foundation of this speciality. But Critchett, and even Jonathan Hutchinson, were general surgeons primarily and ophthalmic surgeons in the second place.

Bowman's name is a household word in ophthalmology. Bowman's membrane, his probes, and "stop" needles are known everywhere; but it was his guiding hand which placed ophthalmology as a speciality on a sure footing. Lawrence wrote on syphilis of the eye. Hutchinson's monograph on syphilitic disease of the eye and ear is a classic, and he was the first to describe the notched incisors in congenital syphilis which will always be known as "Hutchinson's teeth." It is reputed that a French surgeon who visited Moorfields in the early 60's rushed into the out-patient room exclaiming "Where is Monsieur Hutchinson? I want to see his teeth."

Hutchinson's main assistants were Waren Tay and Edward Nettleship. Tay never cared for publicity and was glad to remain in the background. Hutchinson's mantle may be said to have fallen on Nettleship, who had a profound influence in the teaching of ophthalmology in his generation.

Argyll Robertson first described the tabetic pupillary reactions which have ever since borne his name; and in an earlier decade Arthur Jacob, of Dublin, first described the layer of rods and cones in the retina in 1819.

One of the first atlases of the fundus was that of Liebreich who was ophthalmic surgeon to St. Thomas's Hospital. He had been turned out of Paris at the beginning of the Franco-Prussian War of 1870, and came to England. There have been several good atlases since his day, notably that of Frost, the pictures in which are still unsurpassed.

Ophthalmic pathology has been well served by the long line of curators of the museum at Moorfields Hospital. Nettleship, Lawford, Treacher Collins, all made notable contributions in this subject, but George Coats, who died in 1915, probably contributed more papers of lasting value than any other, with the exception of Sir John Parsons whose magnificent Pathology of the Eye in four volumes has long been a credit to British ophthalmology.

For many years the importance of the state of the refraction of the eye was overlooked and underestimated. A case of Brudenell Carter's published in the Clinical Society's Transactions, in 1875,
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was one of the first to call attention to the importance of this branch of work; and partly in consequence a demand arose for hand-books on refraction; among these, that of Hartridge ran through many editions and was deservedly popular.

In the field of medical ophthalmology, the manual by Sir William Gowers was pre-eminent for many years: its third edition was brought out by Marcus Gunn who, from his experience as Ophthalmic Surgeon to the National Hospital, Queen Square, did much to advance ophthalmology in its relations to neurology. Perimeters have been invented by McHardy, by Priestley Smith and by Sir William Lister. Priestley Smith won the Jacksonian prize at the Royal College of Surgeons in 1878 with his essay on glaucoma. Few men have had more influence on their speciality of recent years than this celebrated Birmingham ophthalmologist.

Ophthalmological Education

Postgraduate education in ophthalmology is given at the universities and at all the great eye hospitals in London and the provinces. Courses of lectures which include all ancillary subjects such as optics, operative surgery, bacteriology and pathology are given during the terms, and at the same time the student takes his place as clinical assistant to one or more of the members of the senior staff in the out-patient department. If time is no objection, he is wise to hold the post of House Surgeon for a year or more at one of the Eye Hospitals. Even if he does not, he obtains a thorough grounding in clinical ophthalmology, and it is this aspect of teaching which has produced so many of the great names of British ophthalmology during the past hundred years. Special diplomas notably the D.O. Oxon. (1907) and the D.O.M.S. (1920) are awarded to students who pass the qualifying examinations, and for many years ophthalmology has been one of a number of special subjects which can be taken in the examination of F.R.C.S. (Edinburgh).

Preventive and Social Aspects of Ophthalmology

Steady progress has been made during the present century both in prevention of blindness and in amelioration of the conditions of the blind. Blind pensions are now awarded, and ophthalmic monetary benefits under the National Health Insurance came into force in 1925.

Early in its history the Ophthalmological Society appointed a deputation, led by Bowman and Hutchinson, to interview the Home Secretary and draw attention to the ravages caused by ophthalmia neonatorum. It was pointed out that this affection is largely preventable, and it was suggested that the Registrar
of Births should hand each person registering a birth a printed paper telling him what to do if the baby's eyes showed any signs of inflammation. No action was taken and little was done by the authorities until the Metropolitan Asylums Board established St. Margaret's Hospital in 1918 for the treatment of ophthalmia neonatorum, affording facilities for the admission to hospital of both mother and child. The Board also did good pioneer work by establishing, in 1903, residential schools for the treatment of trachoma in children, at the same time ensuring the continuance of their education.

The London County Council, at the instigation of Mr. James Kerr and Mr. Bishop Harman, made a notable advance by segregating partially-sighted children in special—so-called "myope"—schools. Valuable reports on the prevention of blindness have emanated from Glasgow in 1926 and in 1942, and from the Union of Counties Association for the Blind in 1932; and the Ministry of Health has at last set up a Standing Committee on the Prevention of Blindness.

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ANNOTATIONS

On second opinions

A doctor, in discussing with a friend the foibles of patients in general, is reputed to have said that if he suggested a consultation, it was because he did'n't know what was the matter, and that if he pooh-pooh'd the idea as unnecessary, he was afraid of showing his ignorance. As in a large number of cases it is impossible to be dogmatically sure of one's diagnosis it is a wise plan to have a second opinion; and in many cases a consultation will be of great help in settling the line of treatment to be adopted. An intelligent patient will understand the problem if it is placed before him squarely, and will be willing to pay the necessary fee. In the case of what Shakespeare somewhere calls "a blinking idiot" a second opinion is even more necessary in order to safeguard oneself.

We do not mean to imply that extra advice should be proposed in all cases. As a general rule a straightforward case of cataract ready for operation need not be referred to anyone else. Probably it would be wise in cases of diabetes with cataract to have a consultation, usually with a physician, before undertaking any operation at all.
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