

- 5 Piguët B, Palmvang IB, Chisholm IH, Minassian D, Bird AC. Evolution of age-related macular degeneration with choroidal perfusion abnormality. *Am J Ophthalmol* 1992; **113**: 657–63.
- 6 Steinmetz AU, Haimovici R, Jubb C, Fitzke FW, Bird AC. Symptomatic abnormalities of dark adaptation in patients with age-related Bruch's membrane change. *Br J Ophthalmol* 1993; **77**: 549–54.
- 7 Tso MOM. Pathogenetic factors of aging macular degeneration. *Ophthalmology* 1985; **92**: 628–35.
- 8 Sarks SH, Sarks J, Killingsworth C. Evolution of geographic atrophy of the retinal pigment epithelium. *Eye* 1988; **2**: 552–77.
- 9 Oliver J, Pauleikhoff D, Bird AC. Morphometric analyses of age-changes in the choriocapillaris. *Invest Ophthalmol Vis Sci* 1990; **31** (suppl): 47.
- 10 Sandberg MA, Miller S, Gaudio AR. Foveal cone ERGs in fellow eyes of patients with unilateral neovascular age-related macular degeneration. *Invest Ophthalmol Vis Sci* 1993; **34**: 3477–80.
- 11 Sandberg MA, Gaudio AR, Miller S, Weiner A. Iris pigmentation and extent of disease in patients with neovascular age-related macular degeneration. *Invest Ophthalmol Vis Sci* 1994; **35**: 2734–40.
- 12 Weiner A, Sandberg MA. Normal change in the foveal cone ERG with increasing duration of light exposure. *Invest Ophthalmol Vis Sci* 1991; **32**: 2842–5.
- 13 Tolentino MJ, Miller S, Gaudio AR, Sandberg MA. Visual field deficits in early age-related macular degeneration. *Vision Res* 1994; **34**: 409–13.
- 14 Sandberg MA, Jacobson SG, Berson EL. Foveal cone electroretinograms in retinitis pigmentosa and juvenile macular degeneration. *Am J Ophthalmol* 1979; **88**: 702–7.
- 15 Brodie SE, Sperber DE, Hope-Ross M. Focal ERG phase-lag diabetic macular edema. *Invest Ophthalmol Vis Sci* 1993; **34** (suppl): 1179.

History of ophthalmology

Discovering the uses of the ophthalmoscope

In the early years after Helmholtz invented the ophthalmoscope, the even greater task of discovering what was normal and what was pathological began. Not that the instrument was rapidly accepted – to quote the editor of the *Medical Times*, it was 'ridiculed and denounced' by many physicians as a dangerous toy! Jabez Hogg of the Westminster Ophthalmic Hospital worked hard to redeem this situation by publishing a book on its use. However, those attending the Ophthalmological Congress in Brussels in 1857 debated its utility at length.

Summaries of the normal and abnormal appearances of the retina began to appear in the literature. Opacities in the lens were noted, and Williams describes the 'beautiful opaque streaks' with enthusiasm. Floating bodies in the vitreous were seen 'bounding and darting about' and were considered common, although their cause was a mystery.

By 1865, funduscopy was confidently used in the diagnosis of renal disease. For example, 'Mary Ann' was a sewing machinist who had undergone much hardship. Her sight had begun to fail since Christmas 1864 when she had 'sat all day in wet clothes', and she presented to Mr Hulke. On ophthalmoscopy, her retinal veins were 'turgid', and grey-white patches were visible. Kidney disease was diagnosed, and confirmed by the finding of albumin and casts in the urine. Mr Hulke sent 'Mary Ann' away with some muriate of iron, and exhorted his colleagues to remember the use of funduscopy in renal disease. Dr Hughlings Jackson agreed with this point, while stressing the association of fundal changes with cerebrovascular accidents. A pithy description of a patient with retinal haemorrhages who was 'in a ripe condition for extensive cerebral apoplexy', but 'also ready to die in many other ways' followed. It is hoped that this opinion was not communicated to the patient, or at least that his alleged slight deafness saved him from hearing it!

Later, in the early 1900s, more detailed investigation of 'flame-shaped haemorrhages' and arteriovenous nipping took place, and the connection with hypertension firmly established. Understandably, some misdirections occurred:

Bardsley differentiated the signs of arteriosclerosis from hypertension, and believed that the retinal signs could appear and disappear rapidly. Armed with a large supply of adrenaline chloride and his house officer he set out to prove this on his patients. After injecting enough adrenaline to secure a rise in blood pressure of at least 45 mm Hg – an effect which could be achieved in an ethics committee chairman merely by reading this account – the retina was examined. Bardsley reported that fullness of veins and AV nipping was seen – just as he had previously noted in cases of toxæmia, and that it disappeared when the blood pressure fell. Indeed, having tried this on all the patients, he felt that it should be possible to indicate the blood pressure merely from funduscopy.

Others felt that even established arteriosclerosis was reversible. Crofton described a 60-year-old man with small, tortuous retinal arteries and severe AV nipping. Advised of his grave prognosis, the patient went on a sea voyage. On his return 2 months later, Crofton reported that all silver wiring was gone, and the AV nipping had considerably lessened.

Not all physicians believed in the prognostic implications of high blood pressure, although many prohibited the use of the eyes, feeling that the strain of vision might worsen the disease. Adams described a 64-year-old with an arterial pressure of 250 and a host of flame-shaped haemorrhages, who lived a further 4 years. 'Why treat?' insisted Adams, as hypertension is a sign to which the patient does not object.

Doubtless these physicians would be fascinated to hear about the developments that have occurred, although if Crofton did cure the retinal signs of hypertension, then it seems that some valuable knowledge has been lost.

F ROMAN

Adams PH. Influence of vascular disease of the retina on prognosis of life. *Br J Ophthalmol* 1917; **1**: 55.

Anonymous. Medical and surgical practice. *Medical Times and Gazette* 1865; Nov 18: 551.

Bardsley PC. The retinal signs of arteriosclerosis compared with those due simply to high blood pressure. *Br J Ophthalmol* 1917; **1**: 239.

Crofton WM. Can advanced arteriosclerosis be reversible? *BMJ* 1910; Aug 6.

Williams E. The ophthalmoscope. *Medical Times and Gazette* 1854; **9**: 7–11.