A pioneer in the quest to eradicate world blindness
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The late Sir Harold Ridley, who died in 2001 shortly after receiving a knighthood in recognition of his pioneering work in the correction of cataract blindness, remains known almost exclusively for his invention of the intraocular lens and related innovative forays into various subspecialties of “high-tech” ophthalmology, which we now call biomedical engineering. Ridley implanted the first intraocular lens on 29 November 1949. This invention, whose description is reproduced here (1), has been of vast importance: over 50% of visual disability and blindness in the world — especially in the developing world — is caused by cataract (2).

I first met Harold Ridley in 1985, at a time when much of his work was still not accepted by many, including members of the academic medical establishment (3). Even his lens implant (4), arguably one of the most important innovations in the history of ophthalmology and a huge blessing to society, was widely criticized. It was not until 1986 that he was elected a fellow of the prestigious Royal Society, and in 1989 he received an honorary degree from the Medical University of South Carolina; he was knighted in 2000, more than 50 years after his outstanding gift to humanity.

Sir Harold’s series of contributions began during the Second World War. Indeed, his story represents one of the finest examples of efforts to apply knowledge acquired during a conflict to the development of technical innovations for the benefit of mankind. The Battle of Britain in the summer of 1940 was a horrific struggle, and Ridley’s invention of the intraocular lens was based in part on his examinations of fighter pilots’ eyes. In his very first publication on the topic in 1951 (5), Ridley wrote the following insightful statements that laid the foundation for his invention: “In the eye itself some information had been gained from war injuries, in which fragments of plastic material had been driven into the eye by an explosion or by the impact of a bullet on the Perspex (plastic) cover of an aircraft”. It also marked a turning point in the development of some principles of prosthesis implantation: “Unless a sharp edge of the plastic material rests in contact with a sensitive and mobile portion of the eye the tissue reaction is insignificant”.

There is absolutely no question as to Ridley being the sole inventor and first implanter of the intraocular lens. This is in sharp contrast to the vast majority of new drugs, devices and other therapeutic agents that have generally been invented or developed by several individuals or teams, often with controversy as to priority.

Unfortunately, there was a huge backlash against Sir Harold’s invention and surgical procedure by his peers, especially from the academic establishment in his own country as well as in the USA. Until that time, eye surgeons had been taught to take things out of the eye (foreign bodies, inflammatory material, tumours, etc.), whereas Ridley’s technique required a new thought pattern, namely the concept of putting something into the eye. His invention thus represented a radical paradigm shift, which was difficult for many to accept.

The early 1950s witnessed two other important scientific discoveries, the elucidation of the double helix structure of DNA by Watson & Crick in 1953 and the first successful initiation of a nuclear chain reaction by Enrico Fermi and colleagues in Chicago in the same year, which overshadowed the dissemination of information about Ridley’s invention. However, in the fields of vision correction and blindness prevention, Ridley’s invention has had a powerful influence on numerous patients’ lives.

Ridley’s invention of the intraocular lens was not only the introduction of a new and important adjunct to cataract surgery, in his own words “a cure of aphakia”, but in reality represented a much broader and more significant innovation. In effect, he helped to pioneer the modern field of biomedical engineering, specifically the field of artificial device implantation, preceding by many years the introduction of all other major devices designed for tissue or organ replacement and implantation.

In addition to implantation of “standard” intraocular lenses intended to replace the opaque, diseased cataractous human lens and thus cure aphakia, this procedure has opened up a flood of new possibilities to implant highly specialized lenses and bionics for specific clinical purposes. In effect, Sir Harold opened the lock to the previously inaccessible capsular bag, the membrane-like scaffolding composed of a portion of the outer capsule of the patient’s lens that is not removed at surgery but is left in place. The capsule’s structure is such that it can wrap around the implanted prosthetic device. Its presence provides a base for a wide array of modern vision-enhancing innovations such as accommodative lenses and multifocal and paediatric intraocular lenses. Ridley’s invention has provided us with the necessary platform to carry out such procedures.

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Intraocular lenses have been a major advancement in ophthalmology, with over 50 million lenses implanted worldwide. The development of these lenses was a result of Sir Harold Ridley’s innovative thinking and dedication to improving vision outcomes for patients.

Sir Harold Ridley, a British ophthalmologist, is credited with inventing the intraocular lens in 1949. This invention was a significant milestone in the field of ophthalmology, allowing for the successful treatment of cataracts and other ocular conditions.

Ridley’s work on intraocular lenses exemplifies the importance of innovation and research in advancing medical technology. The development of the intraocular lens has led to improved surgical outcomes and has had a profound impact on the field of ophthalmology.

As the technique of intraocular lens implantation continues to evolve, it is important to recognize the contributions of early pioneers like Sir Harold Ridley. His work has laid the foundation for ongoing advancements in ophthalmic surgery, enabling better outcomes for patients and furthering the specialty's growth.

References