Sir Harold Ridley’s vision

This valediction to the late Sir Harold Ridley commemo-
rates the 50th year of his first publication in the St Thomas’s 
Hospital Report, describing his pioneer undertaking to 
research, design, and implant an intraocular lens to correct 
aphakia.

Dissatisfied with the poor acuity and loss of binocular 
single vision following unilateral cataract extraction and 
the poor outcome, particularly in children, with the contact 
lenses then available, he had early in his career envisaged 
using an artificial lenticulus. His research was catalysed by 
the now famous remark of a medical student, that it was a 
pity that the cataract he had seen extracted could not be 
replaced by a clear lens. In his paper Ridley described his 
threefold problem. Firstly, he had to find an inert material 
for what would be an intraocular foreign body. In this he 
was inspired in his choice of poly(methylmethacrylate) 
which became the gold standard of implant materials. Ani-
mal experiments were rejected by Ridley, although they 
might have added to the surgical techniques proposed, on 
the grounds of adding little to the known intraocular toler-
ance of the material. This lack of inflammatory response to 
glass and plastic intraocular foreign bodies, provided they 
did not touch the iris, had been observed in the eyes of 
injured aircrew who survived aerial combat in the second 
world war. Optical laboratory benchwork was not under-
taken. To sterilise the implants he used cetrimide solution 
which unbeknown to him could be absorbed by and later 
leached from the poly(methylmethacrylate), causing ante-
rior uveitis, which was attributed wrongly to the implant 
material itself. Later, sodium hydroxide was used before 
present day gas sterilisation.

To solve his second problem, of implant design, Ridley 
copied too closely the radii of curvature of the human lens 
and his first two prototypes resulted in high myopic pseudo-
phakia. Redesigned, subsequent implants produced 
remarkably little anisometropia with refractions of about 2 
dioptres sphere difference compared with the fellow eye. 
He was also prophetic of preoperative biometry and of 
implant banks when he wrote that “In the future it may be 
desirable to produce lenses to individual specification to 
attain ammetropia.” Ridley hoped to present the results of 
his secret experimental surgery with perhaps a 2 year 
follow up but as knowledge of the project leaked out it was 
published first in the little read journal, St Thomas’s Hospi-
tal Report, to establish his priority.

Sir Harold Ridley’s epoch making operation was done 
on 29 November 1949, when for the first time he inserted 
an artificial acrylic lenticulus into a human eye. This was 
the left eye of a 45 year old female patient whose cataract 
was unilateral, and the extracapsular cataract extraction 
technique was used. However, he was uncertain that the 
implant was stable and so removed it then and there and 
re-inserted it definitively, as a secondary procedure on 8 
February 1950 when the eye had healed and had become 
quiet.

Where Sir Harold was most perceptive was in deciding 
that the most physiological place to position an intraocular 
 lens was in the posterior chamber. His third problem— 
namely, to find the means of providing stable fixation 
remained unsolved until 1975 when Shearing introduced 
polypropylene haptics designed for capsular bag insertion. 
Ridley recommended extracapsular cataract extraction 
and hoped the lens would remain secure, sandwiched 
between the iris and posterior lens capsule. It seems today 
quite incredible that this implant which weighed 45 times 
more than a modern one was similarly positioned in a 
small number of patients’ eyes following the then popular 
technique of intracapsular cataract extraction. Indeed, to 
place the heavy Ridley lens in the ciliary sulcus, before 
operating microscopes and without damaging the zonule 
or lens capsule, must have been very demanding. Eventu-
ally the incidence of complications arising from lens 
decentration and anterior uvelitis led to the abandonment 
of the whole procedure. However, Ridley’s vision of 
pseudophakia was so compelling as to encourage numer-
ous ophthalmologists to design a multitude of anterior 
chamber angle supported lenses including the Ridley 
mark II tripod lens several of which I inserted under his 
guidance as his resident at Moorfields Eye Hospital in 
1970.

Ridley had to watch the abandonment too of all these 
early anterior chamber implants because of the disastrous 
appearance of lens induced endothelial decompensation 
and bullous keratopathy, which arose mainly from poor 
design and substandard manufacture. Even a surgeon as 
excellent as Barraquer had to explant half the anterior 
chamber lenses he had inserted.

Ridley shared in the universal condemnation which fell 
upon lens implantation, the development of which might 
have ceased save for the resolute inventiveness of 
Binkhorst, Worst, Choyce, and Poyodorov. That this 
condemnatory attitude, albeit softening, persisted into the 
1980s is unsurprising, when implants were patented, 
trademarked, and some fatuously labelled as “one size fits 
all” and “a lens for all seasons,” and even as late as 1983 a 
publication from Moorfields Eye Hospital expressed reserv-
ations about implants.

That Ridley chose to initiate his work in secret without 
any previous experimental research, at St Thomas’s 
Hospital, rather than at Moorfields, may have led to 
resentment on the part of Sir Stewart Duke-Elder whose 
immense power of influence and support as director of 
research at the Institute of Ophthalmology and Moorfields 
Hospital, rather than at Moorfields, may have led to 
resentment on the part of Sir Stewart Duke-Elder whose 
immense power of influence and support as director of 
research at the Institute of Ophthalmology and Moorfields 
Eye Hospital, was thereafter denied to Ridley. Today it is 
difficult to imagine to what extent Ridley’s idea became 
professionally scorned and dismissed. Had his concept of 
pseudophakia originally been openly presented, sup-
ported, further researched, and scientifically developed, 
the collateral loss of sight suffered by patients in those early 
years might have been avoided with probably little loss of 
the time it has taken for the safety, efficacy, and validity of 
the device to become so self evident. Ridley recognised 
posterior lens capsular opacification and the prevention of 
this and the correction of pseudophakia presbyopia remain 
as challenges for the future.

A decade ago Sir Harold underwent successful bilateral 
len implantation at St Thomas’s Hospital. He thus

www.bjophthalmol.com
became not only one of very few men to benefit from his own operation, but also to have had it done in the same hospital where he pioneered it—a fact which always greatly pleased him.

In this tribute to Sir Harold Ridley, whose vision has been truly vindicated, let us hope that his additional aspiration, written in his first publication—namely, that “this operation may be the best that is possible until finally biochemical and endocrinological research teaches us how to prevent cataract developing,” will be achieved and acknowledged.

HUGH P WILLIAMS, FRCS FRCOPTH
Moorfields Eye Hospital, City Road, London EC1V 2PD, UK
Sir Harold Ridley's vision

HUGH P WILLIAMS

doi: 10.1136/bjo.85.9.1022

Updated information and services can be found at:
http://bjo.bmj.com/content/85/9/1022

These include:

Email alerting service
Receive free email alerts when new articles cite this article. Sign up in the box at the top right corner of the online article.

Notes

To request permissions go to:
http://group.bmj.com/group/rights-licensing/permissions

To order reprints go to:
http://journals.bmj.com/cgi/reprintform

To subscribe to BMJ go to:
http://group.bmj.com/subscribe/