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-
aphakia. 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 uveitis 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 Pyodorov. 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
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
lens implantation at St Thomas’s Hospital. He thus
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 FRCOPHTH
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/