Introducing Brian Boycott and Heinz Wässle, the 1999 Recipients of the Proctor Medal

There can be no better testimony to the unifying power of twentieth century vision research than the award of the century’s last Proctor Medal jointly to Brian Boycott and Heinz Wässle. One came of age in a London battered by the Luftwaffe during the second World War; the other grew up in a defeated Germany amid attempts to overcome the almost total physical and intellectual devastation caused by only 12 years of Nazism. Boycott, as a laboratory technician graduating in zoology in Birkbeck College of London University, began his research career in 1942 working in H. H. Dale’s former laboratory at the National Institute for Medical Research. In 1947 he joined J. Z. Young at the Stazione Zoologica in Naples to work on brain pathways and memory of the octopus. Wässle learned Latin and Greek under the tutelage of Benedictine monks in a Humanistisches Gymnasium before enrolling as a physics student in the University of Munich.

Our awardees separately came face-to-face with vision research under the influence of two previous ARVO medalists. When Boycott was a Visiting Lecturer at Harvard in 1963, he met John Dowling, who was then finishing his PhD with George Wald. Wässle as a student in 1967 heard William Rushton lecture in Munich on why we don’t see stars during the day. Recapturing the excitement caused by lectures of Rushton and Dowling 30 years ago makes it easy to understand the influence they had on the future generation of scientists. Rushton, who spent his life in Trinity College at Cambridge University, England—not if not eloquent—personified the impression that penetrating and brilliant intellect propels the advance of knowledge. Dowling, then and now from the other Cambridge—and no less eloquent—embodied the paramount influence they had on the future generation of scientists. Rushton and Dowling 30 years ago makes the experimental preparation and technique.

In the event, Boycott went to collaborate with Dowling on a series of epochal studies in which they related the ultrastructural types of synapses observable under the electron microscope to the types of nerve cells seen by light microscopy. They worked particularly in the primate retina. The incisive use of Golgi staining and electron microscopy permitted them to show basic connectivity patterns of the main cell types, and the results proved to be general for all vertebrate retinas. These discoveries had an impact comparable to those of Cajal and Polyak and were miles ahead of the work of the time. Dowling and Boycott were soon joined by Helga Kolb, the Proctor Medalist of 1993. Their work, together with that of Dowling and Werblin, another ARVO medalist, convincingly illuminated the early functional working of the vertebrate retina. They were heady days when new anatomic marking techniques, the taming of electron microscopy as a research tool, and the skillful use of intracellular recordings all combined to produce, for the first time, a circuit diagram of the retina that has stood the test of time.

Meanwhile, Heinz Wässle was a physics student working in Herbert Schober’s Institute of Medical Optics in Munich, where under the tutelage of Rainer Röhler he acquired a thorough understanding of the use of modern optical tools in the description of the eye’s optics. This led him to a PhD thesis on the neurophysiology of visual acuity under Otto Creutzfeldt, at the time in the Max-Planck Institute for Psychiatry in Munich. In an example of the sequential, analytical mode that has characterized Heinz Wässle’s scientific curve all along, he went for postdoctoral training with W. R. Levick in Peter Bishop’s laboratory in Canberra, specializing in the physiological/morphologic identification of retinal ganglion cells.

Both of our awardees have had the opportunity to establish themselves academically and have received fitting professional recognition. Boycott became Professor of Zoology in London University in 1968 and was elected Fellow of the Royal Society (F.R.S.) in 1971. He joined the MRC Biophysics unit at King’s College that year and in 1980 succeeded M. H. F. Wilkins as Director. Wässle was named Director at the Max-Planck Institute for Brain Research in Frankfurt in 1981 and is an honorary professor of biology at the University of Mainz.

What has led to the award of the Proctor Medal is a remarkable collaboration that has joined their work for over 25 years, the primary focus and eventual aim of which is the full description of neural processing in the primate retina. Their first paper in 1974, they took the crucial step of recognizing that, because the grain becomes coarser going toward the periphery, one must compare retinal neuron types at a given eccentricity. That insight allowed them to define alpha versus beta cells with total confidence and opened the way for the next 25 years of recognizing specific types. Then in the late 1970s and early 1980s, they showed that nearly all retinal neurons “cover,” now we say “tile,” the retina completely with little overlap. These fundamental insights, demonstrated for horizontal cells and ganglion cells in cat and then in the primate, gave other investigators a framework for moving forward with other cell types and other species and thus galvanized anatomic studies where progress for 35 years after Polyak had been slow. Since then, the steady stream of research from Wässle’s Institute in Frankfurt, where he is leading a group of excellent younger scientists in the use of modern tools of neuropharmacology and cell biology, is opening up prospects of biochemical and structural aspects of retinal processing that bodes well for launching yet a further revolution in our knowledge of that ultimate site of origin of vision, the retina.

When all is said and done, the touchstone of what we admire most in scientists and colleagues, is a vista that elevates their lines of sight beyond the immediate and obvious, a clear sense of purpose and of the flow of ideas within a larger frame, a dedication to the enterprise, and, above all, an incorruptible integrity. In all these attributes our 1999 Proctor Medalists are models for us to honor and try to emulate.

Gerald Westheimer
1999 Proctor Medal Recipients

Brian Boycott

Heinz Wässle