Stephen W. Kuffler

T. A. Sears (ed.), *Neuronal-glial Cell Interrelationships*  
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Time after time, in a career that spanned 40 years, Stephen Kuffler made experiments on fresh topics, hitherto confused or ignored, in which he revealed fundamental mechanisms and laid paths for future research to follow. In each instance, the striking feature of his work is the way in which the right problem was tackled at the right time, using the right preparation. One can, for example, think of the studies on denervation supersensitivity, stretch receptors and muscle spindles, efferent control, pre- and postsynaptic inhibition, GABA and peptides as transmitters, integration in the retina, and the detailed analysis of synaptic transmission.

In the context of this Dahlem meeting on neuronal-glial interactions and multiple sclerosis, nowhere are these characteristics more clearly demonstrated than in the pioneering studies he made on neuroglial cells with David Potter at Harvard Medical School in the early 1960s. The experiments arose as a result of teaching a course on the nervous system to medical students, during which it became clear that there was no hard information available concerning the physiology of the cells that make up the larger part of the mammalian brain. In those experiments, the key question was to determine the membrane properties of glial cells in contrast to those of the neurons they surround. What were the resting potentials and what was their ionic basis? Were the membranes of glial cells permeable to K, to Na, to Cl, or to all small molecules and ions? Did glial cells give impulses? Did substances like K or Na move through glial cells or around them by way of extracellular spaces? What signals passed between the two types of cells? These well-defined, manageable questions were in marked contrast to a spate of romantic speculations that were in vogue at the time, proposing roles for glial cells in memory, learning, and bulk transport of materials through the brain. At the same time it was by no means obvious how one should record with microelectrodes from