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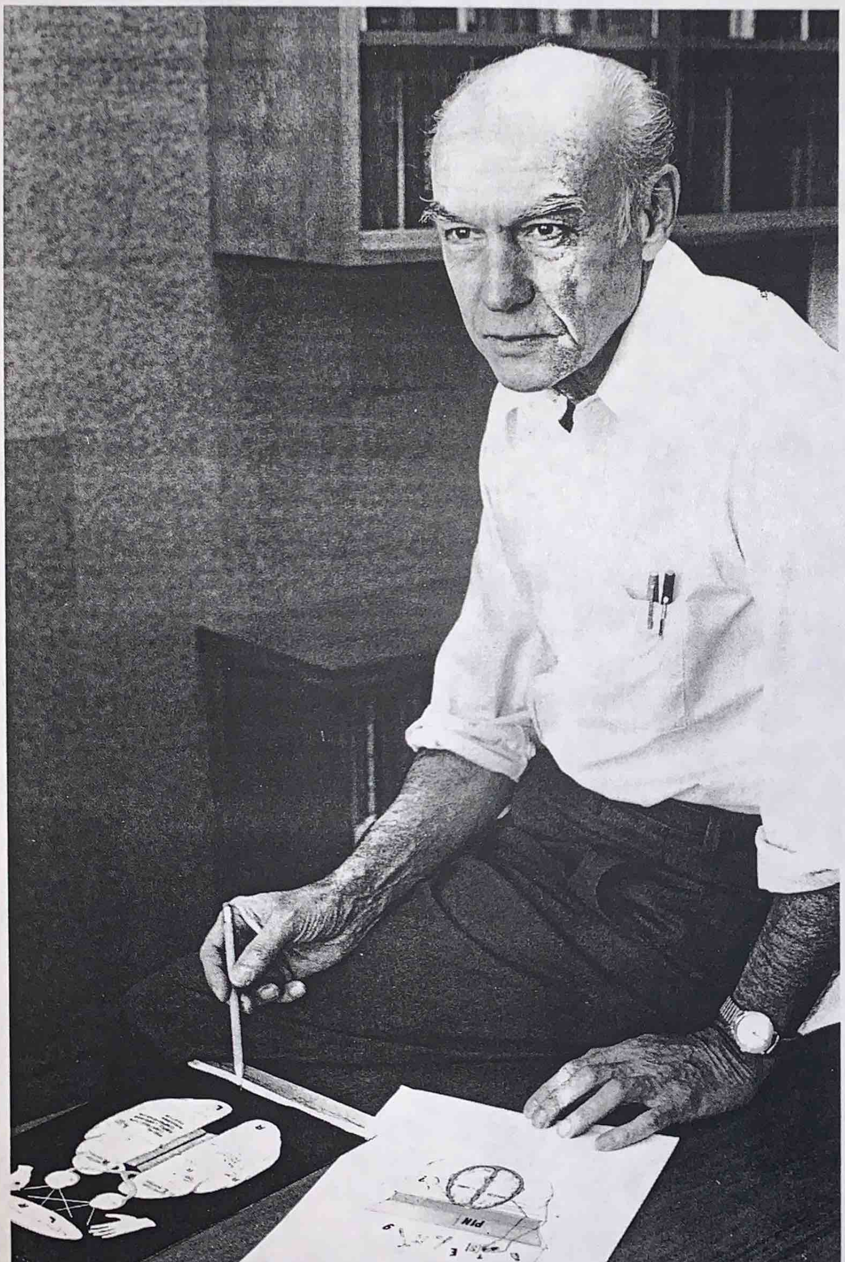
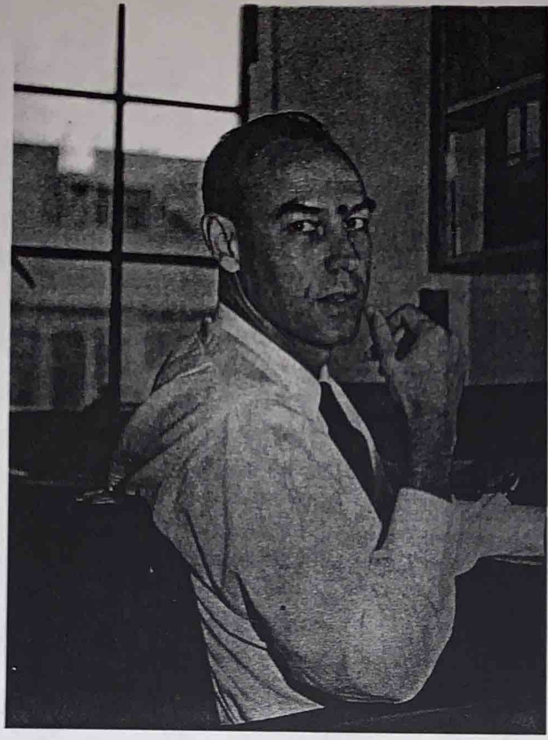
Roger W. Sperry
1914 –1994



Roger W. Sperry, the Board of Trustees Professor of Psychobiology, Emeritus, died April 17, 1994, of complications associated with lateral sclerosis. He had been a member of the Caltech faculty since 1954, for most of that time the Hixon Professor of Psychobiology, and in 1981 won the Nobel Prize for his discoveries concerning the functional specialization of the two hemispheres of the brain. John M. Allman, the current Hixon Professor, chaired a memorial observance June 3 in the Beckman Institute Auditorium, during which several people who had known Sperry well spoke of the importance of his scientific work and his impact on his students, on his colleagues, and on society.

Norman Horowitz
Professor of Biology, Emeritus

I was Roger Sperry's oldest friend on the Caltech faculty. I first met him in 1951, when we were both on the program of a symposium that was held at Smith College in Northampton, Massachusetts. Roger's talk, which I can still remember, was truly brilliant, dazzling. I'm a geneticist; I'm not a neuroscientist, or a behavioral biologist, or a psychobiologist, but I could recognize a master at work. I would not have been surprised if someone had told me then that Roger would be one of the principal shapers of the modern view of how the brain works. In his talk, Roger demonstrated the capacity to design experiments that gave clean answers to interesting questions in one of the most difficult areas of



Roger Sperry at Caltech in 1954.

biology. His surgical skill and his imagination in designing tests of brain function were enormously impressive to me. He proved beyond a reasonable doubt in that paper that the many individual nerve fibers that make up the regenerating optic nerve in amphibians have separate chemical identities that determine where they make their connections as they grow back into the brain. He showed this by logical inference from his biological results, without performing any actual chemistry.

The second thing that struck me about Roger's lecture was its conclusion. Here he displayed a comprehension of the broader biological issues that made him almost unique for that time. I want to read the last two sentences of that paper. They may surprise some people who came to know Roger only in his later years. "Finally, to return to our original theme, it would seem that with the foregoing picture of the developmental processes, almost no behavior pattern need be considered too refined or too complicated for its detailed organization to be significantly influenced by genetic factors. The extent to which our individual motor skills, sensory capacities, talents, temperaments, mannerisms, intelligence, and other behavioral traits may be products of inheritance would seem to be much greater on these terms than many of us had formerly believed possible."

When I got back to Caltech I knew what I had to do. At that time we were searching for the first Hixon Professor of Psychobiology. I spoke to George Beadle, who was then division chairman, and to Anthonie Van Harreveld, who was chairman of the Hixon search committee, and suggested that Roger be invited for some lectures. Roger was invited; he came, he conquered, and the rest is history.

Ronald Meyer
Professor of Developmental and Cell Biology
University of California, Irvine

(Meyer came to Caltech as a graduate student in psychobiology, earning his PhD in 1974. In his memorial talk he described some of his experiences in Sperry's diverse lab and traced the development of Sperry's theory of chemoaffinity—work that began in the 1930s and 1940s. Although it had been postulated earlier that growing nerve fibers used chemical clues to find their way, no one had been able to discover any evidence to support that idea, and current studies were leading in the opposite direction. At the University of Chicago, Paul Weiss concluded that all nerve fibers were created equal, that the pattern of nerve connections was unimportant, and that the important thing in innervation was learning. Sperry was Weiss's graduate student at Chicago and set out to test this idea.)

Initially he was interested in its functional aspects, so one of the first experiments he did was to cross some of a rat's nerves so that they innervated the wrong muscles. Then he looked at the behavior of those rats very carefully; it hadn't been done all that carefully before. He observed that the basic reflex behavior of these animals was always abnormal; the rat could learn to adapt to this screwed-up leg, much as you might be able to walk with a cast, but the function was really abnormal. What he concluded from this was that specific nerves did mediate certain responses, and that connection was important.

Around this time a number of reports appeared showing that in lower vertebrates, such as frogs and salamanders, you could cut the optic nerve and it would grow back. The folks who did this interpreted the results along the lines Paul Weiss had championed at the time—that the animals were simply learning to adapt to abnormal connections. Then Roger did what was perhaps his most famous experiment: he rotated a frog's eye 180°, then cut the optic nerve and let it grow back. (This was not particularly easy. I tried it a few times as a graduate student and gave up.) Now, normally you can tell what the frog sees by using a little wire with a fly on the end. If you put it in front of the frog, the frog will try to eat it; if you put it in back of the frog, the frog turns around and then tries to eat it. The frog has very good visual localization. What