

OBITUARY:

**ROLANDO LARA
ELENA SANDOVAL
WILLI BORCHERS**

On 19 January 1985, brain theory and neuroethology suffered a grievous loss. A car bearing Rolando Lara, Elena Sandoval, and Willi Borchers on a road near Cuernavaca, Mexico, was hit by a truck. All three were killed. Rolando Lara and Elena Sandoval were colleagues at the Centro de Investigaciones en Fisiologia Celular of the Universita Autonoma de Mexico, he a brain theorist, she a neurochemist; while Willi Borchers was from the Arbeitsgruppe Neuroethologie und Biokybernetik, Universitat des Landes Hessen, Kassel, where he was a neuroethologist with a background in biological control theory. Borchers was in Mexico for a month to help Lara and Sandoval establish a laboratory in which both theoretical and experimental studies of brain mechanisms of visuomotor coordination could go hand in hand. It is a small consolation to note that Francisco Cervantes-Perez, who did his master's degree with Lara at UNAM before proceeding to his Ph.D. at the University of Massachusetts at Amherst has been judged to have the necessary scientific maturity to be able to continue the development of this laboratory, though without the neurochemical component that Elena Sandoval would have provided.

The collaboration between Lara, Sandoval and Borchers which was so tragically cut short was part of a broader collaboration involving workers in Germany, the U.S. and Mexico to bring theoretical and experimental studies of visuomotor coordination together. In November of 1981, we held a workshop at the University of Massachusetts at Amherst; in November of 1982 the workshop was held in Mexico with Rolando Lara in charge. We had planned to hold a third workshop in Kassel this summer, with Willi Borchers as organizer. It is now our hope that, under the supervision of Peter Ewert, the Kassel workshop will be held in 1986, dedicated to the memory of our three colleagues. I should simply like to add that, in addition to this professional collaboration, I had come to look upon Willi Borchers as a good friend; while Rolando Lara and Elena Sandoval, whose house in Cuernavaca I would visit each year for a week of science, philosophy, and companionship, had become the very best of friends. Thus, the loss to science is compounded, and not only for myself, by the intense sense of the loss of dear friends.

Rolando Lara y Zavala was born on 14 October 1949, receiving the degree of Mechanical and Electrical Engineer from the faculty of engineering at UNAM in 1974. In 1977, he received the degree of Master of Biomedical Science, with a specialty in physiology, from the faculty of medicine at UNAM. He then spent the years 1978–1980 working with me at the University of Massachusetts on modelling the mechanisms of visuomotor coordination in frog and toad, receiving the Ph.D. in Computer and Information Science in 1981. Upon his return to Mexico, he proceeded to build up a vigorous group working on problems of visuomotor coordination, and carried out a number of investigations on mechanisms of pattern recognition, habituation, and depth and detour behavior. He published in both international and Mexican journals, and was one of the most active contributors to the journal *Cognition and Brain Theory*, contributions to which include “Modelling the Amphibian Visual System: The Tectal Column” (Volume 3), “A Neural Model of Interaction Between Tectum and Pre-Tectum in Prey Selection” (Volume 5), and “A Model of the Neural Mechanisms Responsible for Stimulus Specific Habituation of the Orienting Reflex in Vertebrates” (Volume 6). With Elena Sandoval, he published a thoughtful synthetic essay, “The Neurosciences: Theoretical and Experimental Approaches” in Volume 5 of *Cognition and Brain Theory*. His book, *La Cibernetica del Cerebro* is about to be published by Compania Editorial Continental S.A. in Mexico.

Maria Elena Sandoval Bernal was born on 31 December 1945. She received a degree in biology from the faculty of sciences at UNAM in 1967, and the doctorate in biochemistry from the faculty of chemical sciences at UNAM in 1975. She continued her studies as a visiting investigator in the department of psychobiology at the University of California at Irvine from 1975 to 1977. She developed techniques using synaptosomes to allow the detailed neurochemical analysis of synaptic transmitters, and had gained new insight into mitochondrial calcium mobilization and transmitter release from nerve endings. In recent years, she had moved her neurochemical studies closer to systems involved in visuomotor coordination, with special emphasis on cerebellum and optic tectum. Moreover, in collaboration with Lara, she had developed important views on the relationship between theory and experiment in the neurosciences, and on the philosophical implications of brain research.

Hans-Wilhelm Borchers was born on 3 December 1943. In 1970 he received the degree of Engineer from the Electrotechnical Faculty of the Technische Hochschule Darmstadt. Shortly thereafter, he began the collaboration with Peter Ewert that continued for the rest of his life. He became a dozent (docent) in 1975, and completed his habilitation thesis in zoology in 1980, with a study of the relationship between behavior and neural activity in the retinotectal projection of free moving toads. Since April of 1980, Borchers has been a Professor of Cybernetics in Kassel. He developed a telemetry system

which allowed the video-taping simultaneously of toad behavior and of the activity of selected neurons in the toad's brain. This work is summarized in the paper "A Telemetry System for Single Unit Recording in the Freely Moving Toad (*Bufo Bufo* L.)" which appeared in the book *Advances in Vertebrate Neuroethology* (edited by J.-P. Ewert, R. Capranica and D.J. Ingle) published by Plenum in 1983. It was the promise that such techniques could provide invaluable data for further modelling of mechanisms of visuo-coordination that led to the collaboration with Lara and Sandoval which had such tragic consequences. Our loss is great, but the memory of the friendship and of the scientific contributions of these three colleagues is very much alive. Their research contributions will be an important part of our future research, and their spirit of international cooperation and friendship will continue to be with us.

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